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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ADDRESSES AND ORIGINAL ARTICLES

Diverticula of the Colon and Vermiform Appendix. By H. C. EDWARDS, F.R.C.S.—(*Illustrated*) .. 221

"Whooping-cough Eclampsia." By J. B. ELLISON, M.D. 227

A Simple Method of Controlling a Valvular Pneumothorax. By E. R. BOLAND, M.R.C.P.—(*Illustrated*) 231

Experimental Production of Cancer by Dust Obtained from Tarred Roads. By J. ARGYLL CAMPBELL, M.D. 233

Richter's Hernia and Carcinoma of the Colon. By R. G. PAUL, F.R.C.S. 234

Infra-red Photography of the Superficial Venous System. By R. T. PAYNE, F.R.C.S.—(*Illustrated*) .. 235

Congenital Stenosis of the Aortic Orifice. By J. BROWN, M.R.C.P.—(*Illustrated*) 236

Paratyphoid B in a Child aged Four Months. By H. B. HODSON, M.D. .. 237

MEDICAL SOCIETIES

Royal Society of Medicine: Sections of Epidemiology and Children's Diseases: Ætiology of Acute Rheumatism and Chorea 238

Section of Urology: Factors Influencing Renal Function..... 240

Liverpool Medical Institution: Differential Diagnosis of Pregnancy. 241

Edinburgh Obstetrical Society: Midwifery in General Practice 242

REVIEWS AND NOTICES OF BOOKS

Four and a Half Years. By Christopher Addison, M.D. 243

Amerika und die Medizin. By Prof. Dr. H. E. Sigerist 243

A New Physiological Psychology. By Prof. W. Burridge, D.M. 244

British Journal of Surgery 244

LEADING ARTICLES

THE PREVENTION OF DENTAL CARIES 24

PSYCHOLOGY OF QUACKERY 246

DIPHTHERIA IMMUNITY AMONG ISOLATED RACES 246

THE DISPLAY OF CONTRACEPTIVES..... 247

ANNOTATIONS

Child Guidance Reviewed. 248

Iron Absorption in Anæmia 248

Comparative Study of Bright's Disease 249

The Graefenberg Medical Institute 249

Secrecy and Venereal Disease 250

The Sex Hormones 250

A Subsidised Atlas of Pathology..... 250

Divinyl Ether 251

The Skin-graft Laparotomy Incision 251

A Reversal Effect in Immunity..... 251

Investigation before Operation 252

THE PREVENTIVE ASPECTS OF MEDICINE

XIII.—Prevention of Infectious Diseases. By R. A. O'BRIEN, M.D., D.P.H. 253

INDEX NOTICE

THE LANCET, Vol. II., 1933 252

SPECIAL ARTICLES

Diet and the Teeth 257

Medicine and the Law: Nitrous Fumes Cause Death.—A Physio-medical Practitioner 259

Ireland: St. Vincent's Hospital Centenary 259

CORRESPONDENCE

Battle of the Barbiturates (Sir Maurice Craig) 260

Mucous Colitis (Dr. H. W. Hales) 260

Potency of Vitamin Preparations (Miss Katharine Coward, D.Sc.) 261

Lightning-stroke 261

Acute Hepatic Atrophy in Pulmonary Tuberculosis (Drs. A. Lynn and J. S. B. Mackay) 262

Adenoid and Tonsil Operations (Mr. Hamblen Thomas, F.R.C.S., Mr. R. Worthington, F.R.C.S.) 262

PANEL AND CONTRACT PRACTICE

Antenatal Examination.—The Cut.—Inspection of Surgeries.—Local Defence Funds.—Choice of Chemist 263

PUBLIC HEALTH

Training, Recruitment, and Promotion in the Public Health Service..... 267

From the Kentish Hopfields 268

Vital Statistics for 1933 . 268

Infectious Disease in England and Wales 268

PARLIAMENT

Notes on Current Topics: The Contraceptives Bill 265

House of Commons: Slum Clearance.—Poor Relief in Scotland.—Protection against Road Accidents: New Legislation.—Health Insurance (Additional Benefits).—Housing in Stepney.—Insurance against Third-party Risk 266

OBITUARY

Llewelyn Powell, M.B. ... 264

Annie Jackson, M.D. 264

William James Dowling, M.D. 265

Marjorie M. Duggan, M.B. 265

THE SERVICES

Royal Naval Volunteer Reserve.—Territorial Army.—Royal Air Force.—Indian Medical Service 262

MEDICAL NEWS

Univ. of Oxford 269

Univ. of Cambridge 269

Univ. of London 269

Royal College of Physicians of London 269

Scottish Conjoint Board .. 270

Testimonial to Dr. Mearns Fraser 244

Harveian Society 270

Central Association for Mental Welfare 270

Royal Berkshire Hospital, Reading 270

An Edinburgh Nursing Home 270

The late Mr. Philip Glynn 270

Medical Tour in Provence. 270

Disorders of the Voice.... 270

Post-graduate Courses in Berlin 270

Large Gifts to Hospitals.. 270

St. Mary's Hospital Medical School 270

NOTES, COMMENTS, AND ABSTRACTS

Revision of the British Pharmaceutical Codex.. 272

Short-wave Diathermy and Therapeutic Pyrexia.... 272

Water Shortage and Water Storage 273

Nurses' Accommodation at a Municipal Hospital... 273

Adjustable Spectacles—(*Illustrated*) 274

Children's Allowances 274

Medical Diary 271

Appointments 271

Vacancies 274

Births, Marriages, Deaths 274

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ADDRESSES AND ORIGINAL ARTICLES

DIVERTICULA OF THE COLON AND VERMIFORM APPENDIX*

BY HAROLD C. EDWARDS, M.S. Lond., F.R.C.S. Eng.
JUNIOR SURGEON TO KING'S COLLEGE HOSPITAL, LONDON

The Colon

TRUE congenital diverticula and acquired diverticula of the secondary type—i.e., those due to traction or to disease of the bowel wall—are so rare in the colon that one may be excused their consideration, and this lecture concerns only the acquired primary or hernial type of diverticula.

INCIDENCE

During the seven-year period 1925–31 621 examinations of the colon by means of a barium enema and X rays were made at King's College Hospital. Diverticula were found in 55 of these examinations, giving a percentage incidence of 8·9. Of the 621 examinations, 114 were made in patients of 35 years and under. No diverticula were found in this group, the youngest of the 55 cases in whom diverticula were found being 36. Thus 55 cases were found out of 507 examinations over the age of 35, giving a percentage incidence of 10·8. This cannot be regarded as indicating the general incidence of the condition, however, for the examinations were confined to patients suspected of some pathological lesion of the large bowel. Both Mayo and Rankin and Brown estimate the general incidence to be 5 per cent. in people over 45, and this lower figure is probably nearer the truth.

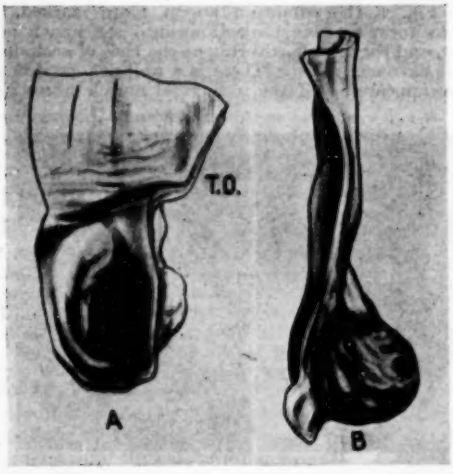

FIG. 2.—Diverticulum removed from the transverse colon (× 1½ approx.). For description see text. T.O.= tænia omentalis.

The average age in 117 cases from all sources at my disposal during this seven-year period is 60, to the nearest unit, the youngest being 32 and the oldest 79. It must be emphasised that this average age bears little relation to the average age of incidence of diverticulosis of the colon, which is a much lower figure. The average duration of symptoms, which were definitely attributable to the presence of diverticula, was, in 35 cases, seven and a half years, so that the average age at which symptoms first arise is nearer 50 than 60. The symptoms are as a rule due to inflammation of pre-existing diverticula, that is to say, to diverticulitis, and it follows therefore that the age of development of diverticula is earlier still—less than 50. Taking this fact into consideration with the rarity of diverticula before the age of 35, one may estimate the age of incidence of the onset of diverticulosis to be between 40 and 45. Thus it is essentially a disease of early middle age.

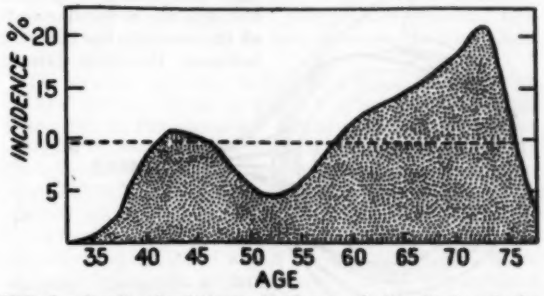

FIG. 1.—Graph showing age-incidence of diverticula of the colon. The dotted line indicates the percentage incidence (55 cases in 621 examinations).

A further analysis of the ages of the 55 cases revealed by barium enema, in which the cases are divided into five-year periods and a percentage worked out for each of these, results in a graph with two peaks to the curve (Fig. 1). The first lies between 40 and 50, and represents the age-incidence of diverticulosis, and the second between 60 and 70, and represents that of diverticulitis.

MORBID ANATOMY

A typical uncomplicated diverticulum of the large bowel is a hemispherical swelling forming a prominence on the peritoneal aspect of the bowel. The diverticula are always multiple, and the sigmoid colon is the commonest situation.

Both the size and the shape of the diverticula vary to some extent according to their situation in the bowel. Fig. 2 shows a large diverticulum removed from the transverse colon. The mouth of the pouch is not of uniform appearance throughout. On one margin it is bounded by a firm crescentic ridge, whereas on the opposite side no such ridge is present, the lumen of the bowel gradually shelving into that of the diverticulum. This aspect is adjacent to a longitudinal muscle band, and corresponds in both situation and direction with the entry of the blood-vessels into the bowel wall.

The points in the circumference of the intestine through which the diverticula emerge are governed by two anatomical factors—the disposition of the longitudinal muscle-fibres and the mode of entry of the blood-vessels. The three tæniæ into which most of the longitudinal muscle-fibres of the colon are gathered are so arranged that one is situated at the line of attachment of the mesentery to the transverse and sigmoid portions (tænia mesocolica and tænia mesenterica respectively) and the other two laterally, equidistant from it. As each terminal blood-vessel approaches the wall of the bowel, via the mesentery, it branches in the manner shown diagrammatically in Fig. 3. The branches are in two sets: (*a*) small

*Hunterian lecture delivered before the Royal College of Surgeons of England on Jan. 24th. This lecture, with the one published in THE LANCET last week, forms part of the Jacksonian prize essay for 1932.

vessels, which continue in the direction of their parent vessel and pierce the mesenteric tænia to reach the submucosa; and (*b*) larger vessels, which pass obliquely to the wall of the bowel on either side, running underneath the peritoneal coat until the lateral tænia is reached, at which point they pass through the circular muscle coat to reach the submucosa. A branch is usually given off from each of these large vessels to the corresponding appendix epiploica, though in some cases this arises from the main artery. No vessel of any importance passes through the muscular wall of the bowel in the interval between the two lateral tæniæ. The sites of election for the diverticula are in two rows, immediately to the mesenteric (or mesocolic) side of the two lateral tæniæ. These points of origin correspond exactly with the sites of penetration of the muscle wall by the largest vessels supplying the gut. As these points also coincide with the attachments of the appendices epiploicæ, the diverticula are often obscured by fat in obese patients.

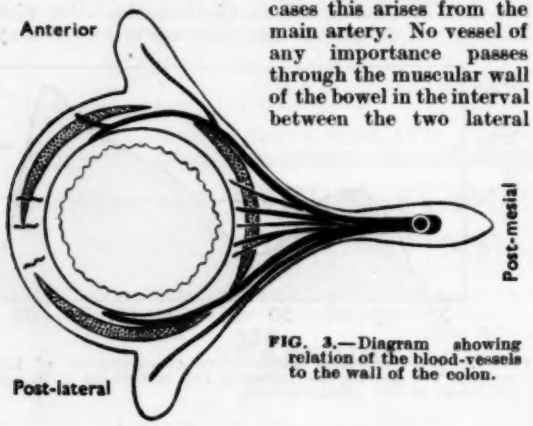

FIG. 3.—Diagram showing relation of the blood-vessels to the wall of the colon.

The stages in the development of diverticula can be studied naked eye by a series of specimens of diverticulosis of the transverse colon.

Fig. 4 illustrates a comparatively early case. The transverse colon has been opened by cutting along the bowel close to the tænia mesocolica, and two rows of pouches are revealed, spaced at irregular intervals, but each at the edge of a tænia on its mesocolic aspect. The pouches thus correspond exactly in situation to the points of entry of the blood-vessels. Not only this, but the direction of the long axis of each pouch is the same as that of the vessels.

In Fig. 5 a more advanced stage of diverticulosis has been reached. The pouches are deeper and more numerous, but the area of bowel between the two lateral tænia still remains free. The sharp crescentic fold bounding the mouth of each diverticulum on the side remote from the tænia is clearly seen. In addition, the lateral boundaries of the mouth are well defined, standing out as thick folds, and consisting of mucous membrane, submucosa, and a stout band of circular muscle-fibres.

Fig. 6 illustrates a very advanced stage. The bowel wall, except that occupied by the pouches, is thick and so contracted that the two lateral tænia are almost in contact with one another. It will be noticed that even in this severe degree of diverticulosis the portion of bowel intervening between these two tæniæ, albeit extremely narrow as the result of contraction of the circular coat, is practically free from diverticula.

These specimens illustrate the mode of development of hernial diverticula. Each starts by the migration of a wedge-shaped process of mucous membrane through the circular muscle-fibres at the point of entry of a blood-vessel. Once this has occurred, pressure from within the bowel forces the wedge of mucous membrane further along the connective tissue sheath of the blood-vessels and eventually a flask-shaped diverticulum is formed. Pari passu, the circular muscle-fibres between the diverticula have steadily contracted, with actual or apparent hypertrophy, so that the pouches become progressively larger and more prominent, whereas the true lumen of the bowel becomes progressively narrowed. These observations support the view that the initiation and progress of the diverticula are due to forces arising within the bowel wall itself. This view receives further support from a study of the microscopic appearance of the bowel wall both in the "pre-diverticular state" and the stage of fully formed diverticula.

Fig. 7 shows a strip of sigmoid colon in longitudinal section. The circular coat is seen to vary in thickness. In some areas it forms thick bands projecting like hillocks into the lumen of the bowel. In between two such "hillocks" the muscle coat is considerably thinned, so that the mucous membrane is thrown into a series of depressions, and in these situations the muscle-fibres are frequently interrupted by an interval of areolar tissue. In some of these there is a blood-vessel. One gains the impression from this picture that the mucous membrane is being forced into the depressions and appears to be in danger of migrating through one of the areolar intervals, especially where a blood-vessel is to be seen. There is nothing here to prevent its herniation but a thin veneer of muscle. The blood-vessel at the upper end of the section almost invites the mucous membrane to track along its sheath.

In Fig. 8, also showing a strip of sigmoid colon, the hillocks and depressions are more marked, the former forming thick masses of well-developed circular muscle-fibres. At the base of the depressions the mucous membrane is separated from the peritoneal coat only by a thin layer of areolar tissue and one or two muscle-fibres. A higher magnification of the area enclosed in the circle on the right shows a large vessel in contact with the mucous membrane in the floor of the depression, the branches of which extend upwards on either side of the pocket.

In Fig. 9 the condition is yet more marked. The hillocks form massive projections into the lumen of the bowel, and the muscle covering at the base of each depression is extremely thin. There is a well-defined difference in the appearance of the individual muscle-fibres in the hillocks and in the depressions. The former are well developed and appear to have hypertrophied, whereas the latter are thin and appear to be atrophic.

FIG. 4.—Diverticula of the transverse colon. T.L. = tænia libera. T.O. = tænia omentalis.

In these sections the alternation of areas of contraction and hypertrophy of the circular muscle with areas of relaxation and apparent atrophy is striking. The projections into the lumen of the gut are in every sense mirror images of the neighbouring protrusions from the gut. Barsony suggests that under these conditions the muscle coat corresponding to the depressions undergoes atrophy—a relaxation atrophy. The condition undoubtedly arises from irregular

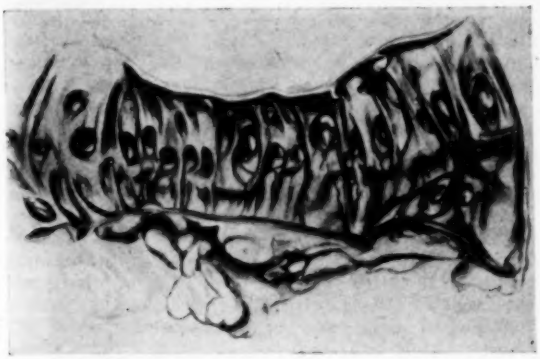

FIG. 5.—Diverticula of the transverse colon. A more advanced stage.

spasm of the circular muscle coat, and is the pre-diverticular state. Should a vessel correspond with one of the areas of atrophy, herniation of the mucous membrane to form a diverticulum is inevitable.

Although difficult to show from microscopic preparations, it is very probable that the longitudinal muscle coat is also contracted, and this is borne out by naked-eye examination of specimens of diverticulosis. The effect of such contraction is to favour the development of diverticula by exaggerating the normal sacculation of the bowel.

The step from this condition of the bowel to the development of diverticula is but a short one, as the next illustration shows (Fig. 10).

Here, at two situations marked by the presence of blood-vessels, the mucous membrane has succeeded in passing right through the thin muscle layer at the bases of the depressions to form definite diverticula. The one has a narrow neck and is flask-shaped, whereas the other is wide-mouthed with a shelving edge. In each case a thin layer of muscle is carried into the diverticulum, but disappears for the most part before the fundus is reached.

In Fig. 11 the condition is more established. The diverticula are buried in pericolic fat, into which they have been guided by the blood-vessels. This specimen illustrates very well the shortening of the bowel which accompanies the formation of the pouches. The hillocks are brought nearer together as the result of the migration of the mucous membrane at the bases of the depressions.

The conclusions arrived at after naked-eye and microscopic examinations of these specimens may thus be summarised:—

1. The diverticula are herniations of the mucous membrane through a gap in the musculature. The muscular coat of the bowel is continued in many instances into the wall of the diverticulum, but gets progressively thinner towards the fundus.

2. The diverticula are the outcome not of atonicity of the bowel muscle but of spasticity. The musculature is irregularly contracted, and contracted areas alternate with areas of relaxation and ? atrophy, through which herniation of the mucous membrane is likely to occur.

3. In passing through the muscle coat to reach the submucosa the blood-vessels determine a local weak area in the bowel. The larger the vessel the greater the weakness. When the entry of a large vessel corresponds with an area of relaxation the formation of a diverticula appears to be inevitable.

THE RADIOLOGICAL ASPECT

I cannot here give a complete review of the series of changes in the bowel wall which are evident (in diverticulosis) upon X ray examination of the colon by means of a barium enema.

The earliest change is probably a marked irregularity of haustration in a spastic type of bowel, but one must be cautious in accepting this as the pre-diverticular state, for it is certain that many cases showing this radiological appearance do not go on to the formation of diverticula.

The earliest definite finding is a pin-head elevation on the surface of the bowel. The next stage is that described as the saw-edge appearance. Next is seen a series of pear- or flask-shaped protuberances, and in the advanced state the diverticula are almost complete spheres, apparently attached to the bowel by a narrow stalk. When fæcal retention is present in the diverticula a variety of appearances may be obtained on radiography, all of which are due to a partial filling of the diverticula with barium. These appearances are shown diagrammatically in the drawings in Fig. 12, made from X ray films of actual cases.

FIG. 7.—The prediverticular state. A longitudinal section of the sigmoid colon. The line points to a vessel at the base of the depression. This, and the sections following, have been magnified between three and four times.

FIG. 8.—The prediverticular state. A more advanced stage.

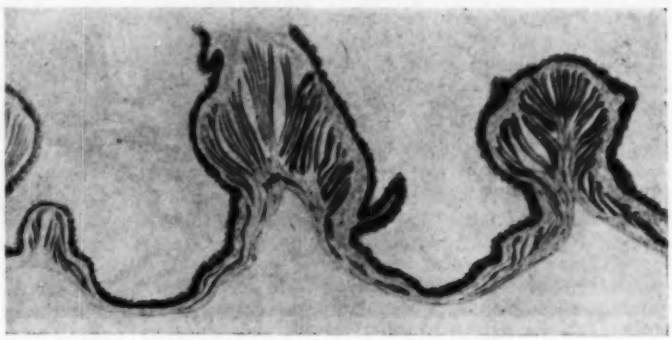

FIG. 9.—The prediverticular state. ? Early diverticulosis.

PATHOGENESIS

The diverticula are thus herniations of the mucous membrane and submucous coat of the colon through the muscular coat. That the condition is acquired and not congenital is indisputable on the evidence of the age-incidence alone. In addition, though a thin layer of muscle may be found in the wall of a diverticulum, the latter does not conform in any way to the accepted definition of a congenital diverticulum.

All that has been said in my first lecture with regard to the mode of development of diverticula of the small bowel is equally applicable to diverticula of the colon. There is little evidence that the blood-vessels play any part in the formation of the pouches other than that of providing a weak area through which herniation may occur. The second factor concerned in the development is the pulsion force, which is derived from pressure inside the intestine. The source of this pressure is twofold: (*a*) the pressure of the contents of the bowel, and (*b*) the contraction of the muscular coat.

The first-named may be called the passive pressure and the second the active pressure. The two are largely interdependent. Pressure of bowel contents may excite muscular contraction and will hence be indirectly responsible for active pressure. Similarly, the degree of pressure generated by the contraction of muscle will depend upon the quantity and quality of the contents of the tube—that is to say, the leverage. Though it is therefore impossible to assess the relative responsibility of these two factors in exciting pressure, the degree of pressure ultimately achieved must depend upon the tone or degree of tension in the muscular wall.

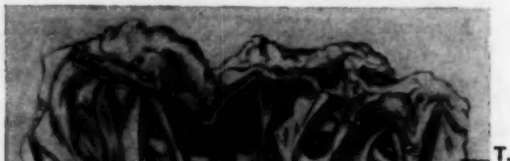

FIG. 6.—Extreme diverticulosis of the colon. T.L.=tænia libera. T.O.=tænia omentalis.

FIG. 10.—Diverticulosis of the sigmoid colon.

FIG. 11.—Diverticulosis of the colon. The fully developed condition. The diverticula are buried in pericolic fat.

During life the bowel is never completely atonic, and it is a mistaken concept that constipation will necessarily produce a high pressure inside the lumen of the gut. Constipation is the effect and not the cause, and may result equally from sluggishness of the bowel, in which the pressure will be low, or spasticity, in which the pressure will be abnormally high.

That passive pressure per se does not cause diverticulosis is shown by the absence of diverticula in cases of passive distensions of the bowel from obstruction. Data obtained by experimental distension of the bowel after death are entirely valueless, as has been pointed out in connexion with diverticula of the small bowel.

The importance of passive distension lies solely in its interdependence upon the behaviour of the muscular coat of the bowel. The combined effect of the presence of solid contents and the higher degree of excitability of the sigmoid colon seems to explain why the latter is the most common situation for diverticula.

The increased pressure which initiates the process of herniation through the vascular gaps depends ultimately upon the contraction of the muscular coat itself. But this contraction is clearly not a normal one, nor a response purely to a physiological stimulus. Before discussing the nature of this abnormality, attention is drawn to some aspects of the normal activity of the colon.

THE PHYSIOLOGY OF MOVEMENT

X ray studies of the movement of the human colon provide more accurate data than experimental observations upon animals. The most characteristic movement to be seen radiologically is the mass movement of Holzknecht, which

occurs at long intervals during the day. The head of barium is seen to move rapidly from the region of the hepatic flexure down to the sigmoid colon. The movement is sudden, not occupying in all more than 10 to 15 seconds, and is, apparently, a true peristalsis, preceded by a wave of relaxation. Immediately after a mass action the bowel regains its normal appearance. Local movements affecting the haustra are sluggish, and, except during a mass movement, the haustra vary only slightly in shape under normal conditions. The function of the haustra is to grip the contents of the bowel and to bring the greatest possible surface area of the mucous membrane into contact with the fæces. The latter stimulate the circular fibres to contract, so that the haustra are deepened and the fæces may be gripped very firmly. In the newly excised colon of the rabbit considerable force may be required to dislodge them.

The local movements of the colon may be studied by observing the behaviour of bowel prolapsed through a colostomy wound. The mucous surface presents and the contraction is readily induced by any form of mechanical stimulus. Immediately on stimulation there is a powerful contraction of the longitudinal muscle-fibres, so that very considerable shortening results. In the normal bowel this would result in an increase of haustration. At the same time contraction of the circular muscles takes place. This is of two kinds:—

(*a*) Shallow waves passing over the surface of the bowel.

(*b*) Extreme local contractions, so that small areas of mucosa are drawn into deep pits. Although contraction takes place readily enough, relaxation is sluggish. If a piece of fæcal material is drawn into one of the pits it is gripped very firmly

ABNORMAL ACTIVITY OF THE COLON

The degree of activity of the musculature of the colon is very readily influenced by a large variety of factors. The absence of a suitable amount of food residue in the colon will lead to sluggishness and constipation results. On the other hand the presence of an irritant purgative results in a feverish activity and diarrhœa. Both constipation and diarrhœa are responses, in these instances, to an altered degree of activity, and not to any abnormality of action upon the part of the musculature, and are not, therefore, likely to result in any lesion of the bowel. Both the pathological specimens and the X ray appearances strongly suggest that in diverticulosis there is an aberration of muscular action, the chief feature of which appears to be abnormally prolonged spasm of the circular muscle-fibres, so that bands of muscle bulge into the lumen of the bowel. Such spasm occurs at irregular intervals along the course of the gut, so that deep and irregular haustrations are formed. In the intervals between such "contraction rings" the wall of the bowel is relaxed and bulges outwards, giving a mirror image of the spastic drawing-in. The specimens examined naked eye and microscopically show that the muscle coat in the relaxed areas is thin and appears to be atrophic. To this appearance Barsony has applied the term "relaxation atrophy." It is in these situations that diverticula are likely to originate, provided a predilected spot exists, such as that provided by the passage of blood-vessels.

In the spastic bowel the small pitting depressions described in the prolapsed colon will grip their contents with increased vigour. The tendency to squeeze the mucous membrane out between the muscle-fibres will be increased correspondingly, and the possibility of herniation of the mucous membrane in these situations will become a probability should such a depression correspond with the entrance of a large vessel through the muscular coat. The outcome of such irregularity in bowel action is likely to be constipation, and this corresponds with the clinical history in early cases of diverticulosis. A careful inquiry into the bowel habit of these cases will reveal irregularity, although the patient may not, in the first instance, admit to constipation.

It is thus contended that diverticulosis results from irregular spasm of the bowel musculature, maintained over a long period of time. It is, in my view, extremely probable that the mechanical processes at work are similar for all acquired primary diverticula of the intestinal tract, irrespective of the part in which they occur, and their differences of pathological anatomy are determined solely by the differences in normal anatomy of the part of the intestine affected.

FIG. 12.—A series of diagrams made from radiograms of cases, illustrating the progressive changes in diverticulosis.

(A) and (B) Marked irregularity of haustration. ? The prediverticular state.

(C) Pinhead elevations in the sigmoid colon and (D) the "saw-edge" appearance. These illustrate the earliest absolute evidence of diverticulosis.

(E) Well-developed diverticula, with wide mouths.

(F) The advanced condition. Note the marked narrowing of the lumen of the bowel.

(G) The varied appearance of diverticula containing fæcal material.

ÆTIOLOGY

Our incomplete knowledge of the neuromuscular control of the intestine is responsible for our difficulty in determining the nature of the factors to which this abnormal behaviour of the bowel is due. In this connexion attention will naturally be first focused upon the neuromuscular tract itself. It has been suggested that the neuromuscular junction (the Auerbach's tissue of Keith) undergoes changes in quantity and quality in conditions in which the bowel action is at fault. Though it is true that in severe chronic constipation some evidence of change in structure can be made out, in early cases of diverticulosis this tissue does not differ in any way from that in the normal bowel. Alvarez, the importance of whose work cannot be over-estimated, brings forward very strong evidence in favour of the myogenic theory of bowel contraction, and it seems highly probable that the fault lies in a hyperexcitable state of the bowel musculature itself. This concept at once suggests a number of possibilities, and offers yet

another opportunity for the presentation of the convenient theory of focal sepsis.

Factors not directly associated with the bowel may be suggested. Changes in the blood plasma and endocrine disturbance, and, if it were not for the fact that all classes of patients are equally affected, avitaminosis. All these possibilities do little more than reveal the extent of our ignorance, and indicate work to be done rather than work achieved.

THE TREATMENT

Once diverticula are formed there is no known means of eliminating them short of excision of the colon, and the mere existence of diverticula does not justify the performance of any such radical measure. In diverticulosis the whole of one's endeavour should be directed towards the prevention of the complication—viz., diverticulitis. In the great majority of cases when first seen there is already some evidence of infection of the diverticula, and it is the symptoms arising from this that bring the patient. The essential feature of the treatment is to prevent retention of fæcal material in the pouches, for this is the constant forerunner of diverticulitis. Thus treatment follows the orthodox lines of avoidance of excess roughage in the diet and obtaining regularity in the bowel movement. In cases of mild diverticulitis the colon wash-out is extremely useful, but it should be administered carefully, the wash-out being a small one and under low pressure.

The real treatment of diverticulosis lies in its prevention, and in this respect we are limited by our inadequate knowledge of the ætiology. One can but suspect all subjects in whom an irregularity in bowel habit appears in the late thirties and the early forties to be potential sufferers from diverticulosis, and attempt to restore the bowel to a normal behaviour. This is largely a question of eliminating causes. Can surgery help in the treatment of the spastic colon which refuses to yield to other measures, apart from its use in eliminating possible sources of infection? Recent work on the autonomic nervous system suggests the possibility; but the time is not yet arrived when a definite answer can be given.

FIG. 13.—Diverticula of the appendix resulting from obstruction and inflammatory changes in the walls. (Mr. Edmunds' case.)

Diverticula of the Vermiform Appendix

During the five-year period 1927–1931 1493 appendices were removed at operation, and in eight of these diverticula were present, giving a percentage incidence of 0·53. Radiological statistics are of little value in determining the frequency of the condition, for in most cases of diverticula of the appendix some degree of obstruction is present, and it therefore does not fill with barium. Thus it is with great rarity that diverticula of the appendix, such as illustrated in Fig. 13, are revealed by X rays.

The average age in twelve cases at my disposal is 42, the oldest being 64 and the youngest 18. In all cases the diverticula are of the hernial type and are multiple. The most favoured site for their development is along the mesenteric aspect, corresponding with the entry of the blood-vessels, and next to this the convexity (antimesenteric border) where, as Stout has shown, terminal vessels pass into the muscular coat. But the diverticula do not, as is their custom elsewhere in the alimentary tract, patronise exclusively the points of entry of the blood-vessels,

FIG. 14.—Diverticulosis of the appendix. Note the migration of the whole lumen through the muscular wall. All the diverticula are on the mesenteric aspect. (Mr. Edmunds' case.)

and may occur at any situation in the circumference of the appendix.

Examination of the specimens reveals at least two distinct types of diverticula, which may be classified thus:—

(*a*) Diverticula secondary to chronic inflammation of the wall of the appendix.

(*b*) Diverticula whose formation precedes inflammatory changes—primary diverticula.

Fig. 13 illustrates an example of the secondary type. Chronic inflammatory changes have produced weakened areas in the muscular coat and a partial obstruction to the lumen. The result has been distension of the whole lumen of the appendix, with herniation of the mucous membrane irregularly through the muscle coat to form diverticula.

In the primary group there is no inflammatory stenosis of the lumen of the appendix, but the mucosa is thrown into folds (Fig. 14). Between the folds are deep crypts, which, in some specimens, have been distended to form wide-mouthed pouches. There has been a relative increase in the length of the mucosa and submucosa as compared with the muscularis and serosa. This effect is due not to lengthening of the mucosa but to the shortening of the muscular coat. This is the change which also probably precedes the rare cases of intussusception of the appendix. The second striking observation to be made from the study of these cases is the migration of the whole lumen of the appendix to one or other side, so that both layers of mucous membrane are carried through a gap in the muscle. This causes a secondary obstruction, so that the crypts in the tortuous lumen actually become distended to form diverticula.

The phenomenon of migration of the lumen associated with relative increase in the length of the mucous membrane is difficult to explain. It cannot result from intraluminal pressure, nor from external traction, but is undoubtedly the result of muscular action. Considerable evidence in support of this is furnished by experiments by Stout upon the living dog. Persistent retraction of the longitudinal muscle-fibres of the appendix will result in corrugation of the mucosa and the formation of folds in it. If this is associated with similar contraction of the circular coat the folds will be pressed together and the lumen obliterated. The tightly compressed folds of mucosa will seek an outlet, and this may be provided by a gap in the muscular coat occasioned by the passage of a vessel, so that both layers of the mucosa, containing the obliterated lumen, will migrate through the muscular wall. The distal portion of the appendix will thus become obstructed, and the crypts between the folds of the mucosa will be distended into saccules.

Over the surface of these the muscular coat may atrophy eventually, so that fully developed diverticula of the hernial type will come into being.

Thus in one form, at least, of diverticula of the appendix the cause lies in an aberration of muscular activity, and the condition is brought into ætiological parallelism with hernial diverticula elsewhere in the large and small intestine.

My thanks are due to the council of the Royal College of Surgeons for permission to use material from the Jacksonian essay in the preparation of these lectures. I wish also to thank my medical and surgical colleagues at King's College Hospital for allowing me to make use of clinical material from their cases; Prof. M. J. Stewart and Mr. P. N. B. Odgers for the loan of specimens of diverticula of the duodenum; Dr. H. K. Graham Hodgson and Dr. T. V. Critchlow for help with radiograms; Miss Mary Barclay-Smith and Mr. S. Steward for the illustrations; and Miss J. Hunt for preparing the photographs. Finally, I wish to acknowledge my very great debt to Mr. Arthur Edmunds, senior surgeon to King's College Hospital, for his sympathetic and practical interest in the work as a whole.

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"WHOOPING-COUGH ECLAMPSIA"

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It is well known that the incompletely myelinated brain of the young child is liable to chaotic discharges of nervous energy, but this alone will not account for the severity and frequency of general convulsions in whooping-cough as compared with other diseases of childhood.

Ever since the time of Sydenham's [1] classical observation, the nature of this deadly complication has been a subject of debate, especially in Germany. While it is not easy to find a single explanation to account for every case, the constant occurrence of severe and usually fatal convulsions, in many epidemics of pertussis throughout the world, has prompted most observers to regard them as an integral expression of the primary disease, whatever may be their precise pathological basis. The German writers, desiring to sharpen the razor of Occam, have implied this peculiarity in the term *Keuchhustens-eclampsie*—a word with no English counterpart, probably because the subject has attracted little attention in this country.

In discussing the question it is convenient to distinguish five principal theories: the apoplectic, the spasmophilic, the meningo-encephalitic, the neurotoxic, and the angiospastic.

APOPLEXY

It was formerly the fashion to attribute the varied and remarkable nervous disturbances occasionally observed during or after an attack of whooping-cough to gross mechanical interference with the circulation brought about by the violence of the cough itself. It was indeed admitted that, in a few cases, purely secondary causes, such as the invasion of the lungs or meninges by virulent micro-organisms, might be in operation, but Löschner [2] placed apoplexy first in order of frequency, followed by passive congestion and tuberculous meningitis as causes of "Eklampsie."

Eustace Smith [3] mentions hæmorrhage, thrombosis or embolism of the cerebral vessels, then collapse of the lung and broncho-pneumonia as immediate exciting causes. The literature of pertussis is rich in accounts of cerebral hæmorrhage; by 1899 Schreiber [4] had collected 38 supposed examples of which, however, only 10 were based on post-mortem evidence; Hockenjos [5] found hæmorrhages in the meninges in 4, and in the cortex in 5 out of 11 autopsies; Rhein [6] succeeded in collecting 20 proven examples. Nevertheless, considering the prevalence of whooping-cough, it is quite rare. In Reiche's [7] series of 26 autopsies on patients dead from *Keuchhustens-eclampsie* hæmorrhage was discovered in only one. Hada [8] could only discover records of 4 cases with extensive hæmorrhage into the brain, 2 with extradural and 3 with meningeal effusions. In 2 of these reported by Cazin [9] and Thomas,[10] respectively, death was preceded by general convulsions. Later reports have for the most part confirmed the opinion of Hada that in all such cases some inflammatory or toxic lesion of the brain or its vessels will be found in addition. Singer's [11] report on the brains of 6 patients dead from *Keuchhustens-eclampsie* (including a pair of identical twins) will be considered in the light of later theories; suffice it to say now that Singer did not attribute either the convulsions or the hæmorrhages observed in his cases to the stasis and congestion brought about by the paroxysms themselves. Sternberg's [12] report of a case of multiple staphylococcal abscesses in the cerebrum a few months after pertussis appears to be unique.

The view that convulsions may be produced by simple venous stasis without any actual hæmorrhage (the old opinion of Löschner which is still current in some English text-books) cannot be summarily dismissed. Wolff and Lennox [13] have shown, by direct observation of the pial vessels of a cat through a window in the skull, that raising the intrathoracic pressure through insufflation, by so little as 16 mm. Hg, produces complete arrest of the cerebral circulation. After a few minutes convulsions appear, soon followed by syncope and death. On the other hand, simple venous obstruction does not readily produce convulsions in human beings. Dalma, for instance, had maintained jugular pressure in 35 epileptics for as long as five hours without inducing a fit. In any case such an explanation will not, as Neurath [14a,b] has repeatedly stated, serve to account for *Keuchhustens-eclampsie*. It will not explain the appearance of convulsions between or immediately preceding spasms of coughing, nor does it account for the status eclampticus so often observed as a terminal event.

Moreover, very severe venous congestion produced by a paroxysm is sometimes (as in a case recently observed by me) seen to end in profound syncope, or "temporary death" as it has been called. Sakauchi [15] is careful to distinguish this condition from convulsive states. It is now generally agreed that, while in a small number of cases the child may "cough itself into a convulsion," this explanation is in most cases totally inadequate to meet either the clinical or pathological findings. A diagnosis of hæmorrhage should only be made with the greatest caution, since it will often be confounded by the sequel (see, for example, the curious case reported by Cabot and Cabot [16] which puzzled all the specialists of Massachusetts).

SPASMOPHILIA

The spasmophilia theory, which is of respectable antiquity, has received a considerable impetus through

the development of precise physical and chemical methods within the last twenty years. It is supposed, according to this view, that convulsions are really a manifestation of previously latent tetany. This statement is supported by two sets of measurements: (1) galvanic irritability of muscles; and (2) blood calcium determinations.

GALVANIC IRRITABILITY

Wernstedt[17] demonstrated in a local epidemic at Stockholm a relationship between galvanic excitability and the severity of the cough. In 58 per cent. of the severest, but none of the mildest, cases the K.C.C. was less than 5 ma. Late observers, however, have shown that this is certainly not a constant phenomenon. Erlanger,[18] in a series of cases drawn from a wider area, observed this phenomenon in only 11 out of 60 cases. Evidence of spasmophilia was found in only 2 of 5 cases dying in convulsions. Fiore[19] concluded, after prolonged investigations, that electrical excitability in pertussis is a function of the duration rather than the severity of the disease. Thus the patients were always more easily excitable in the early days than later, even in the mildest cases. This was attributed to the effect of a toxin and not to a concomitant spasmophilia. Cozzolino[20] agrees that spasmophilia is probably only incidental to and not characteristic of the disease.

It is certainly possible to discover cases in which the association is present. Blühdorn[21] has reported 3 fatal cases, in two of which there was clinical evidence of tetany (Chvostek, Trousseau, galvanism, &c.). On the other hand, Gottlieb and Möller's[22] series of fatal cases provided not one single example. These authors are convinced that spasmophilia plays no part in the production of convulsions in pertussis. Tetany was never observed in any of Reiche's[7] 29 cases, 26 of which proved fatal. Hofmann's[23] observations were also negative on this point. Husler and Spatz[24] are of the opinion that spasmophilia may possibly be present, at most, in 10 per cent. of all cases of "pertussis-eclampsie." Out of 70 cases collected by myself clinical evidence of tetany was found in only one.

SERUM CALCIUM

The spasmophilic theory received a fresh impetus from the observations of Powers[25] on the serum calcium of five eclamptic patients suffering from rickets and pertussis. The highest value found was 8·9 mg. per 100 c.cm., and the lowest 4·9 mg. Three of the patients recovered and two died from broncho-pneumonia. Although Powers was inclined to consider that his results might find a very wide application, it is probable that he was dealing primarily with rickets rather than with pertussis. His results are in close accordance with those obtained by Nourse, Smith, and Hartman[26] in cases of tetany uncomplicated by pertussis. Similar findings have been reported by Woringer.[27] Moreover, the favourable response to therapeutic measures which have repeatedly failed in other hands is further evidence of the special character of his cases.

Measurements of the serum calcium in uncomplicated pertussis have been made by Trambusti and Sertori[28] of Florence, who found an average value of 8 mg. per 100 c.cm. in the early stages of the disease in 11 cases. In a further case (a 5½ months' baby with clinical signs of tetany) the original value found was only 2·4 mg., but neither in this nor in any of the others did convulsions occur. The results obtained by Regan and Tolstuohov[29] are very different. In the course of an extensive investigation of the blood chemistry of pertussis they found that the serum calcium was never outside the normal range in 58 observations. On the other hand, the blood phosphorus was consistently below normal (211 estimations). There was also a striking fall in the blood pH, the lowest value obtained being 6·98. (According to Samson Wright[30] life in the experimental animal is incompatible with a blood pH below 7·22.) Regan and Tolstuohov oppose the view that tetany plays any part in the production of whooping-cough convulsions, but their measurements have apparently never been confirmed.

Apart from the work of Powers, there are few records of calcium determinations on blood withdrawn actually during a convulsion. In a fatal case reported by Askin and Zimmermann[31] the calcium and phosphorus were given as 8·98 and 7·3 mg. per 100 c.cm. respectively. (The 4 months' baby died in "status eclampticus.") In Litvak's[32] case the calcium was reported as 10 mg. (The patient, aged 19 months, recovered but was blind for two months afterwards.) In a case observed by me, blood withdrawn during a convulsion which proved fatal shortly afterwards was found to have a calcium content of 11 mg. per 100 c.cm. This patient was a healthy boy of 5 years and 7 months.

Regarding the evidence as a whole it seems likely that "spasmophilia" has been over-estimated as a possible cause of *Keuchhustens-eclampsie*. It is a striking fact that all the work (including that of Powers) demonstrating low calcium levels in pertussis has been performed on Italian subjects. Possibly this is a racial peculiarity; in any case it is doubtful whether the results obtained by Powers and Trambusti and Sertori can be regarded as valid for the whooping-cough population of the world at large.

MENINGO-ENCEPHALITIS

In attempting to account for the many complex nervous disorders which may complicate an attack of pertussis, some have supposed the existence of a living biological agent at work in the central nervous system, while others have assumed the presence of a toxin, possibly elaborated in the respiratory tract by the Bordet-Gengou bacillus, which produces inflammatory lesions at a distance.

Thus Strauss, Rabiner, and Guisburg[33] place whooping-cough "encephalitis" in the class of demyelinating diseases of unknown origin, together with measles, small-pox, mumps, and other varieties of encephalitis. Sears,[34] on the other hand, reiterates the opinion, expressed long ago by Neurath[14a] in a well-known monograph, that a toxin acting especially on the cerebral vessels is the probable agent. Various degrees or stages of this hypothetical meningo-encephalitis are described, in all of which eclamptic phenomena are prominent. They can be roughly arranged in ascending order of pathological severity.

(1) *Meningitis serosa* is generally diagnosed on the discovery of a high pressure together with excess of lymphocytes in the cerebro-spinal fluid. Apart from convulsions, clinical evidence of meningitis in such cases has been rarely recorded. Szabo (quoted by Neurath) saw only 4 instances in over 4000 cases of pertussis. Boenheim[35] made this diagnosis 5 times in 2690 cases of whooping-cough. In three of Reiche's cases there was slight arachnoid infiltration with lymphocytes. Certainly the spinal pressure is not always high in convulsions. Reiche found high pressures in five out of fourteen punctures. I have observed this only in 4 out of 21 cases. It is worth noting that this so-called serous meningitis differs from other forms so designated in that it does not yield to lumbar puncture. Moreover, the diagnosis of meningitis is not always pathologically justified. In the case described by Jochims[36] four punctures were performed, three of which yielded a fluid containing excess of lymphocytes. After the fourth the patient died in "status eclampticus" (after biting off the end of her tongue), and Jochims noted with surprise that the meninges were quite normal. "Serous meningitis" may possibly be the result and not the cause of the convulsions.

(2) *Pachymeningitis productiva interna.*—Under this cumbersome title cases have been described by Reimer,[37] Hada,[8] and Ostertag.[38] The most notable feature was the extreme vascularity of the meninges. In Ostertag's case death was due to rupture of newly formed meningeal capillaries. Hada's patient survived the stage of "pachymeningitis" with convulsions, but succumbed 76 days later to a secondary otitic meningitis, leaving two sets of pathological changes to be disentangled post mortem. Singer[11] has plausibly criticised the diagnosis in these cases on the grounds that the authors are really describing the organising stage of a previous meningeal hæmorrhage.

(3) *Serous or hæmorrhagic encephalitis* has been frequently claimed as a cause of convulsions. Batten,[38] in one of the infrequent English reports on this subject, described a case of pertussis complicated by "encephalitis." Comby [40] likens pertussis to influenza in its effects on the brain. Hada acquiesces in this opinion. Pospischill [41] claims that there is a specific form of encephalitis due to pertussis—*das Pertussis-gehirn*—and this opinion has been frequently echoed by Mikulowski.[42] The case reported by Askin and Zimmermann [31] presented the unusual findings of focal collections of mononuclear cells in the subependymal tissue of the left ventricle and in the hippocampus. Apart from a single small subarachnoid effusion there were no hæmorrhages. There was no perivascular cuffing. The meningo-encephalitic theory seems to be considerably strengthened by the appearance of paralyses of variable duration and extent following initial convulsions. It was such events that led Marie [43] and Moebius [44] to suggest the existence of "pertussis encephalitis." In the cases described by Turnowski [45] and Baginsky [46] extensive paralyses were noted immediately after severe convulsions. In Rhein's case a spastic diplegia developed eight months after pertussis, leading to death in convulsions. Small scattered hæmorrhages and perivascular mononuclear infiltration were found at autopsy. The reverse of this picture has been observed in a case reported by Arnheim,[47] in which a boy of 8 years, the victim of spastic paraplegia, aphasia, and idiocy (*cerebrale Lähmung*), contracted pertussis and died in general convulsions. An extreme degree of cerebral damage is recorded in a remarkable case described by Ford.[48] The patient, a negress aged 20 months, developed general spasticity after pertussis eclampsia. Death occurred from an intercurrent infection and the autopsy revealed diffuse atrophy of the cerebral convolutions. Histologically there was universal loss of nerve-cells with glial proliferation. Ford states that the changes bore no resemblance to those of the encephalitis of measles or vaccinia.

On the other hand, transient palsies observed after convulsions are not so easily explained by meningo-encephalitis. Ibrahim [49] quotes the case of a girl of 3½ years who developed convulsions four months after the onset of pertussis, followed by a hemiplegia lasting only six hours. Loewy [50] observed a paralysis which recovered in four weeks. In Langer's [51] case convulsions were followed by five weeks of blindness, when complete recovery occurred. (In this case the convulsions preceded the cough.) In the case report of Cabot and Cabot a boy of 7 years became unconscious after violent convulsions, and then developed right hemiparesis which had almost disappeared a week later. In view of the rapid recovery it is difficult to accept the reported diagnosis of multiple hæmorrhages in this case.

Criticism of the meningo-encephalitic theory is directed against the inconstancy of the pathological changes recorded from time to time. It has been objected that no specific whooping-cough encephalitis has ever been convincingly demonstrated. It is further claimed that all the clinical and pathological appearances are explicable by one or other of the remaining theories to be discussed, granting the occasional occurrence of gross hæmorrhage as a rare cause of motor and sensory disturbances.

A NEUROTOXIC

In 1924 Husler and Spatz [24] published a paper which has given rise to much discussion; they described certain peculiar histological abnormalities in the brains of two infants, dead from *pertussis-eclampsie*. While they noted slight inflammatory changes in the vessels of the cortex and a mild degree of mononuclear infiltration of the pia, there was nothing to suggest the existence of an encephalitis similar to that recognised in other infectious diseases. On the other hand, they demonstrated peculiar degenerative changes in the nerve-cells of the cornu ammonis, the Purkinjé cells of the cerebellum and certain portions of the basal ganglia. The medulla and spinal cord escaped. Husler and Spatz described these changes as "homogenising," and stated that ultimately the damage, which was regarded as irreversible, led to complete disappearance of the nerve-cells with a replacement proliferation of neuroglia. They considered that the destruction of nervous tissue was to be attributed to the action of a toxin. They were quite aware that the appearances which they described were by no means pathognomonic of whooping-cough.

Sclerosis of the cornu ammonis is a venerable observation in *epilepsy*.

First noticed by Bouchet and Cazauvielh [52] in 1825, attention was focused on it by the work of Meynert.[53] It occurs in a variable proportion of cases. Worcester [54] found the sclerosis in 23 out of 40 examinations. Bratz [55] found lesions of the cornu ammonis in 50 per cent. of epileptics and 25 per cent. of *general paralytics* examined. Kogerer [56] reported acute fatty degeneration of the cells in this region in two cases of *tuberculous meningitis* dying in convulsions. Bratz and Grossmann [57] supply a list of the conditions in which they sought for these changes. Spielmeyer,[58 a b c] who has devoted much attention to this question, discovered the characteristic cell degenerations especially in the "section of Sommer," and in the cerebellum in as many as 80 per cent. of epileptic brains. He has also described similar changes in the Purkinjé cells in *typhus*. Spielmeyer states that the lesions cannot be the direct result of the convulsions themselves, because he has noted similar changes in stuporose conditions without fits. Damage to the cornu ammonis is not characteristic of all *infantile convulsions*. Bratz did not find it in the brains of 16 infants dead from various kinds of convulsions. Bratz and Grossmann observed the "typical sclerosis" in only 6 out of 14 cases of convulsions in infancy.

Neubürger [59] considered that the clear spaces devoid of nerve-cells (*Lichtungen*), described by Husler and Spatz, might be due to air emboli introduced into the circulation through lung capillaries ruptured during paroxysm of coughing, but modified this opinion later.

The observations of Husler and Spatz have received ample confirmation. In the case described by Jochims there were lipoid changes in the cornu ammonis, though the basal ganglia were unaffected. In Ford's case there was virtually complete destruction of all the cells in the cornu ammonis, and the basal ganglia were slightly affected. Yamaoka [60 a b c] examined the brains of three fatal cases of pertussis. In the first, dead after convulsions lasting for nine days, there were severe changes in the cornu ammonis and the anterior nucleus of the thalamus, with extensive glial proliferation. In this case there were no meningeal changes and no hæmorrhages. Toxic changes observed in other parts of the brain were attributed to the accompanying pneumonia. In the second case, in which convulsions were present for two days only, the degeneration was less severe. In the third case, in which convulsions did not occur, the ammon's horn was normal. It was therefore concluded that the pathological damage runs parallel with the severity of the convulsions. It should be stated that the pathological changes described by Husler and Spatz have never been observed in pertussis unaccompanied by convulsions.

In pursuance of the neurotoxic theory Yamaoka has studied the effect of Bordet-Gengou toxin on the central nervous system of rabbits in an endeavour to repeat the observations of Takagi [61] and Okutani,[62] who claimed to have produced convulsions by suboccipital injection of this toxin. He saw no such results in his animals, but observed some injury to ganglion cells and slight meningeal inflammation in two out of 13 animals. There were no hæmorrhages and no damage to cells in the hippocampal area. In later experiments Yamaoka was unable to detect any increased permeability of the blood cerebro-

spinal fluid barrier through the action of Bordet-Gengou toxin.

The principal criticism which the neurotoxic theory has to meet is the fact that the Bordet-Gengou bacillus does not produce an exotoxin. Since there is no such thing as a Bordet-Gengou septicæmia, it is difficult to see how the neural degeneration can be attributed to the endotoxin, the existence of which was demonstrated by Bordet and Gengou [63] in 1909. This may be countered by the assertion that in pertussis the organism plays a rôle analogous to that attributed by Shope [64] to the *Bacillus hæmophilus suis* in swine influenza, and that the general systemic manifestations of the disease may be produced by an unknown partner—possibly a virus. There is little evidence for this at present, but the suggestion has been recently put forward by Rich.[65]

ANGIOSPASM

It has been suggested by Spielmeyer that the similar degenerative lesions observed in the cornu ammonis, cerebellum, and basal ganglia in a number of different convulsive states are to be regarded as ischæmic changes resulting from angiospastic vasoconstriction. The cornu ammonis and the Purkinjé cell layer of the cerebellum are to be regarded as areas peculiarly sensitive to a general diminution in the cerebral blood-supply. Uchimura,[66] using very refined methods, has demonstrated that the vessels in these areas are unusually long and tortuous and that the capillary network is less abundant than in other parts of the brain. He has described cases of epilepsy in which unilateral *Ammonshorn-sklerose* was observed, depending on a particular deficiency of one set of blood-vessels. The bearing of this work on the problem under discussion is very obvious. If it can be shown that pertussis eclampsia is simply the effect of cerebral angiospasm, many difficulties are solved—but not all. What, in particular, is the nature of the stimulus to contraction? Yamaoka, believing in the vascular origin of pertussis convulsions, has sought but has not succeeded in demonstrating a toxin acting directly on the walls of the cerebral arteries. Singer, on the other hand, supposes a purely reflex mechanism. In the six brains which he examined he claims to have found a single explanation to account alike for the numerous petechial hæmorrhages and the nerve-cell degenerations he observed, and considers that in pertussis all the injuries to the nervous system are due to a functional disturbance of the circulation, sometimes expressed in ischæmic changes (*homogenisierende Veränderungen*), sometimes as hæmorrhage. He supposes that the vascular nervous mechanism becomes gradually sensitised through repeated violent alterations in pressure produced by the spasms of coughing.

Very striking support for this theory is provided by the experiments of Stewart, Guthrie, Burns, and Pike [67] on experimental cerebral anæmia in cats.

Occlusion of both carotid and both vertebral arteries by temporary ligature produced immediate unconsciousness with loss of all reflexes and cessation of respiration. If the ligatures were released in less than 15 minutes, in most cases complete recovery eventually occurred, but general convulsions usually appeared from 5 to 30 minutes after release, persisting for from two to three hours to as many days. Sometimes death occurred from 12 to 30 hours after the onset. Two experiments are especially noteworthy. In one, after occlusion for ten minutes, convulsions continued for three and a half days. The animal became ataxic, blind, and deaf. When killed on the fifteenth day, no gross cerebral lesions were demonstrated. In the other experiment (No. 83) the animal became demented on the third day following an occlusion of 20 minutes, and convulsions occurred in response to any unwonted stimulus.

It will be seen that the clinical manifestations produced by simple mechanical interference with the cerebral circulation of cats bear a striking resemblance to many cases of whooping-cough eclampsia (see, for example, Langer, Loewy, Jochims, Cabot, and Cabot). There is, however, one big difference. In pertussis we do not observe the preliminary stage of total flaccidity which occurs when all the cerebral arteries are completely blocked. The appearance of convulsions implies, as Foerster [68] has observed, a certain critical degree of cerebral anoxæmia. In the experiments just quoted the animals developed fits when the nerve-cells had recovered as far as this critical stage. The convulsions observed after drowning, hanging, and suffocation, and especially the "anæmic fits" described by Kussmaul and Tenner,[69] belong in the same category. The relationship to coal-gas poisoning deserves special mention.

Changes very similar to those of pertussis eclampsia were described by Hiller [70] in the brain of a woman who died in convulsions after coal-gas poisoning. There was degeneration of the cells of the cornu ammonis and globus pallidus, together with numerous small scattered hæmorrhages. Weimann [71] demonstrated lymphocytic infiltrations in the perivascular spaces associated with hæmorrhage from cerebral arterioles and venules in the same condition. In Grinker's [72] case there was bilateral pallidal degeneration in a patient who developed parkinsonism after attempted suicide by coal-gas. These authors are agreed that the pathological changes are primarily due to a vascular irritant, since coal-gas is not a general protoplasmic poison.

It may be objected that analogy is not proof and that, even if we accept the common vascular origin of coal-gas and pertussis convulsions, that does not prove that a similar agent is acting locally on the cerebral vessels in both conditions. Furthermore, not all convulsions can be attributed to angiospasm. Florey [73] has shown by direct observation that the convulsant thujone (in absinthe) does not act by constricting the cerebral arteries. Nevertheless, the theory of angiospasm is supported by powerful evidence, though there is none to indicate the precise nature or path of the exciting stimulus. There is no longer any physiological objection to this conception. Forbes and Wolff [74] have demonstrated the double motor nerve-supply of the cerebral vessels; vasoconstrictors from the sympathetic and vasodilators from the vagus (by a path recently worked out by Chorobski and Penfield [75]); and Penfield [76] has supplied a morphological demonstration of nerves accompanying the intracerebral vessels. But the precise conditions under which angiospasm occurs are not at present understood, and this fact may help to account for the lack of therapeutic success observed to follow the exhibition of a whole range of "antispasmodic" drugs in pertussis with convulsions.

CONCLUSION

Since "the truth is never pure and seldom simple," it cannot be claimed that any one theory emerges completely triumphant from the welter of conflicting opinions.

I consider that the meningo-encephalitic and the angiospastic theories deserve most consideration. Hæmorrhage is an uncommon secondary event. "Spasmophilia" (in the chemical sense) is a false trail, and a "neurotoxin" an unnecessary supposition. Though the evidence cannot be stated here, there are strong epidemiological reasons for believing that many cases of pertussis eclampsia occur through the combination of whooping-cough and influenza. Even so it is not necessary to assume a definite encephalitis.

Protracted nervous disturbances following convulsions are the exception rather than the rule. (In 70 cases studied by me there were only two terminations: death, 46; and complete and rapid recovery, 24.) It may be simply that the sympathetic system, already rendered unstable through pertussis, is still further deranged by the virus of influenza, to the point at which cerebral vascular crises occur. It seems to me that convulsions preceding or even superseding the characteristic cough can most easily be explained by some such hypothesis.

The acceptance of angiospasm as a working hypothesis does seem to project a faint glimmer of hope into the general therapeutic darkness at present enveloping this complex and uncertain subject.

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A SIMPLE METHOD OF CONTROLLING A VALVULAR PNEUMOTHORAX

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FRENCH physicians, with a sure dramatic instinct, call this condition *pneumothorax suffoquant*, and no one faced with a case will deny the force of the description. Such cases are fortunately rare, and accurate statistics are difficult to obtain. Fishberg states that nearly all cases of sudden death in institutions for the tuberculous are cases of spontaneous pneumothorax, and R. D. Powell stated that 10 per cent. of all those who die of pulmonary tuberculosis do so as a result of this complication. The fact remains that in practice the majority of cases of spontaneous pneumothorax recover, provided sepsis does not intervene. Nevertheless, pneumothoraces sometimes remain valvular and die in spite of all efforts to relieve them.

The cause of death in these cases of valvular pneumothorax is asphyxia and cardiac failure, to which end many factors coöperate. The displacement of the mediastinum causes embarrassment of the heart and great vessels, and the collapse of the affected lung diminishes the aerating power of the lungs, which may still further be encroached upon by the compression and partial collapse of the opposite lung. This collapse produces obstruction to the pulmonary circulation, the pressure is very considerably raised, and great strain is thrown on the right ventricle. Further, the raised intrathoracic pressure impedes the venous return of the blood, and the immobility of the diaphragm still further impedes it. It would be unprofitable to discuss the relative importance of the different factors in producing the cyanosis and air-hunger, since whatever the mechanism involved, it is the pressure of the air in the pleural cavity which produces the symptoms and the removal of this air which relieves them.

MECHANISM OF PRODUCTION

The opening in the lung is of necessity a small one, and when the lung expands with expiration the orifice is closed and the air trapped. As a result of this the pressure gradually rises, but, as West pointed out, this inflation of the pleural cavity can only take place so long as the pleural pressure is less than the atmospheric pressure. Once the pressures are equalised no further escape of air into the pleura is possible, and yet in these cases the

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(*Continued from previous column*)

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intrapleural pressure sometimes reaches a very high figure. Bronfin quotes a positive pressure of 60 cm. of water, and the case I am about to describe had an initial pressure of + 30 cm.

Since inspiration cannot produce these pressures, expiration must be responsible. With forced expiration very high positive pressures can be produced in the respiratory passages. With ordinary quiet expiration a positive pressure in the nose of 3 mm. Hg has been found, and with forced expiration one of 87 mm. Hg, while on coughing with a partially closed glottis pressures of 780 mm. Hg have been found.

Expiration can therefore increase the pressure in the trachea and bronchi to a very much greater degree than can the most forcible inspiration. So that if inspiration starts the rise in pressure in a valvular pneumothorax, expiration completes it, and air can be driven into the pleural cavity to an extent only limited by the strength of the pleura and the thoracic cage containing it. The occasional occurrence of subcutaneous and mediastinal emphysema show that even this latter limit may be exceeded.

ALTERNATIVE TREATMENTS

Laennec advocated the insertion of a needle or cannula, and this is still the treatment most generally recommended. Fishberg, for example, states that a hypodermic needle is sufficient in an emergency; Brunner and Alexander both recommend the use of a valvular cannula. But the simple needle, though worth trying for want of something better, is not invariably or frequently successful, as the case under discussion helps to demonstrate. The method most usually employed is to lead off from the cannula a rubber tube with its end submerged under fluid. When the intrapleural pressure rises above that of the atmosphere air is forced out through the water, which acts as a valve to prevent reinspiration. The exact pressure at which the air blows off can be adjusted by altering the depth at which the tube is immersed.

Von Muralt, on the assumption that the perforation is held open by the expanded lung, recommends for its closure the injection of air into the pleural cavity, so that a high pressure may be produced and the lung collapsed. This method is endorsed by Fishberg, who has used it successfully several times, but it is of very limited application, since many fatal cases have very high pressures and die as the result of them, and still the perforation is not closed.

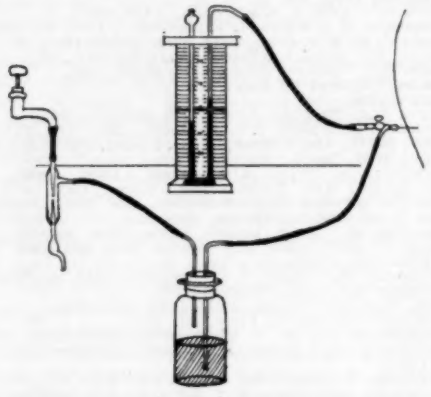
In most cases the foregoing method of treatment with a cannula and water valve is sufficiently successful, the urgent symptoms are relieved, and time is gained while the perforation is healing and the air is becoming reabsorbed. Yet in spite of this, although these treatments have been known for generations, patients still die from their respiratory embarrassment. It is these cases which die in spite of all the recognised methods of treatment which we ought to be able to save.

A CASE DESCRIBED

The fact that the intrapleural pressures in many of the fatal cases have been relatively low has, I think, frequently proved misleading, and the cause of death has been looked for elsewhere. The case I am about to describe shows, in my opinion, that the cardiac and respiratory embarrassment can occur at quite a low pressure, and that even in these cases the embarrassment is directly due to the presence of air and can be relieved by its removal.

The patient, a man aged 52, had been engaged for the previous six years in crushing flints. For the twelve months before admission he had been complaining of increasing shortness of breath, lassitude, and cough. Seven weeks before admission his dyspnœa suddenly became much worse, and he was sent to Dr. Geoffrey Marshall, who diagnosed silicosis with bilateral pneumothorax and this was confirmed by X rays. On admission he was cyanosed and emaciated. His resting respiration-rate was 30 and his pulse 95. He was very feeble and short of breath; the least exertion made him distressed and almost unable to talk.

It was decided to aspirate the right pneumothorax, which was the larger of the two. A pneumothorax needle was inserted and the pressure was found to be −10 to 0. Air was removed and the patient felt so much relieved during the process that more air was removed than perhaps was theoretically safe. After 2000 c.cm. had been removed the final pressure was −18 to −12 and the patient was left very much relieved, being able to talk with little difficulty. Twenty minutes later the patient collapsed, and became grey, cold, cyanosed, sweating, gasping and fighting for breath. The pneumothorax needle was re-inserted and the pressure found to be over +30. Some



air hissed out of the needle but the patient was not materially relieved. Syphon suction apparatus was improvised with Woulfe's bottles and air was aspirated until a negative pressure was induced and the patient was at once relieved. After 20 minutes the condition recurred, and this time the needle was strapped into position and left. For a time discontinuous suction by hand with the suction bottles was employed as soon as the manometer attached to the needle suggested that it was necessary. The intervals appeared to get shorter and shorter and any tendency to prolong them was at once checked by signs of impending distress which returned at exactly the same pressure every time.

Since it was obvious that some permanent drainage would have to be adopted, a rubber tube attached to the pneumothorax cannula was inserted under water in an open bottle. By this method the intrapleural pressure could not rise much above that of the atmosphere, since above that pressure air would be driven out through the tube without being able to return. It was therefore hoped that permanent relief would be secured, and it was with considerable dismay that I saw the symptoms of distress recurring, although the manometer showed that the pressure was only −10 to +1. At that pressure very little air was escaping through the tube, and it was poor consolation to know that the pressure could not rise above this when one saw the patient's distress even at that low figure.

The suction bottles had to be used again while the next move was considered. Remedies which depended for their efficacy on the equalisation of the intrapleural and atmospheric pressures were foredoomed to failure, since dangerous respiratory distress appeared while the pressures were still negative. Something had to be devised which would not only keep the pressure safely negative, but also remove the expired air at the same time, in order to keep the level steady. A Sprengel's pump seemed to answer these requirements. The open bottle was sealed

and another tube inserted through the cork into the bottle with its end well clear of the fluid, and the other end was connected with a Sprengel's pump fixed on to a tap (see Figure). The tap was turned on and the problem was solved. The patient was kept comfortable and unembarrassed with a negative pressure varying between −18 and −10, with air escaping under water owing to the negative pressure in the bottles.

The patient though very weak was again able to talk, and 24 hours after the onset of his pneumothorax he pathetically demonstrated that he could breathe through his nose with his mouth shut, which he had been unable to do for several weeks previously.

For 36 hours the manometer remained steady at a constant negative pressure of −18 to −10, when rather unexpectedly he died, and the manometer slowly came to rest. His death was due to failure of the heart, induced by the previous strain and his great enfeeblement, and was certainly not due to any recurrence of his pressure pneumothorax, once it had been controlled. Post-mortem examination showed bilateral silicosis with dilatation of the right ventricle and a small perforation in the right lung, which was partly collapsed. There was no tuberculosis.

COMMENT

It may appear strange that I should advocate a method of treating valvular pneumothorax as a result of a case where it was employed and the patient died, but I do so because I am confident that had I employed it in the first instance his life could have been saved. It should be remembered that this patient had been cyanosed and dyspnœic for months, with a bilateral pneumothorax and extensive silicosis, and that nearly four hours elapsed before the final treatment was adopted with immediate relief, so that it was not surprising that his heart did not withstand the strain.

Interesting points arise from this case. The first is the fact that marked dyspnœa occurred at relatively low pressures, and the relief which followed the aspiration of air at this stage shows that when there are signs of serious respiratory distress the removal of air is indicated, whatever the pressure found in the chest. In this case the extreme fibrosis and the bilateral pneumothorax probably decreased the patient's margin and produced serious anoxæmia at a much earlier stage than would be the case in an ordinary person.

It is essential to relieve a high-pressure pneumothorax as soon as possible. This patient, for example, was at the point of death when I saw him, and I could have killed him at any time by ceasing to aspirate for 30 minutes. That the patient died 40 hours after the onset of his symptoms, although there had been no embarrassment for 36 hours, shows that every minute counts in the ultimate progress, especially where the patient is elderly, exhausted by disease, or has a weak myocardium. For another reason it is important to avoid the occurrence of anoxæmia since the increased pulmonary ventilation will increase the amount of air which escapes into the pleural cavity.

It was interesting to notice that the symptoms varied directly with the pressure, and in this patient they recurred at almost identically the same manometric pressure, and disappeared at almost the same reduced pressure. His mental anxiety and distress varied directly in the same way. This is important in view of the fact that some writers stress the importance of the psychological factor as a cause of some of their symptoms, and advocate morphia as a method of treatment. I agree that the psychological element is important and that hypnotics may be used with advantage, but only if the primary cause is also remedied.

CONCLUSION

If a spontaneous pneumothorax occurs, air should be aspirated if there is distress, especially if it is progressive. If the recurrence of the symptoms or rising manometer pressure show that the perforation is a valvular one, a blunt pneumothorax needle should be left in with a rubber tube attached to it, and inserted with its end just submerged in an open bottle. If this treatment does not relieve the patient and there are any signs of anoxæmia, then a negative pressure should be produced in the aspirating bottle without delay.

A small self-retaining catheter inserted between the ribs with a trocar might be preferable if the patient's condition admitted it, but the needle is quite sufficient, is more likely to be at hand at times of emergency, and is less likely to introduce sepsis from without.

This case illustrates the necessity of controlling the treatment with a manometer, and this is always at hand in the artificial pneumothorax apparatus.

It might be urged against this method of treatment that the maintenance of the negative pressure means that the perforation will remain patent and will not heal. This might be valid if it were not of primary importance to tide the patient over the effects of the pulmonary disaster. When the patient's life is saved and he has been allowed time to recover from the effects of the initial anoxæmia, one can think with deliberation of the methods to be adopted to heal the original perforation.

It should not be the aim to produce very low negative pressures; only such a pressure as will produce complete relief should be established, and if this is done, I think the perforation, which is of necessity a small one, will soon heal over.

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NOTE ON THE EXPERIMENTAL PRODUCTION OF CANCER BY DUST OBTAINED FROM TARRED ROADS

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A DEFINITE increase in cancer has been recorded and in recent years particularly an increase in lung cancer. The causes of these increases are still debated, many holding that the general increase is due to the fact that more people than previously are living to the age for cancer development, while others maintain that modern conditions are also responsible.

Some authorities regard the increase in cancer of the lung as more apparent than real and hold that the methods for obtaining data from post-mortems are selective and do not cover the whole population. Others state that the increase in lung cancer is due

to tar from tarred roads, excessive tobacco smoking, exhaust fumes from motor engines, and other modern factors. The argument, that dust from tarred roads and fumes from motors cannot be responsible since increase in lung cancer is recorded in countries where there are no tarred roads and few motors, is not sound because dusts and fumes may be carried great distances by winds.

It seemed of interest to test some of these hypotheses and a series of experiments is being carried out with mice, rabbits, and guinea-pigs exposed to dust obtained from tarred roads by sweeping; the dust used contained about 2 per cent. of tar and was composed chiefly of silicates with aluminium, iron, magnesium, calcium, &c. The skin of mice is, of course, very sensitive to tar-painting, warts and cancer being produced; on the other hand, the skin of guinea-pigs is not sensitive at all, but they were employed as well as mice and rabbits because the dust was inhaled as well as coming into contact with the hair and skin. The dust was not rubbed into the skin especially, nor was it brushed off after the exposures. The animals were enclosed in respiratory chambers and exposed to a cloud of dust—such as might occur on a dusty road—four to six times a day for five days a week.

The experiments have been running for about twelve months now and are still being carried on, although the dusting has been discontinued. At this stage it is concluded that road dust containing about 2 per cent. of tar causes warts and cancer of the skin of mice with metastases sometimes in the lungs. Each animal affected shows only one or two warts although the whole skin has been exposed. The first warts appeared after six months of dusting and after twelve months there are 24 out of 59 mice in one experiment showing typical tar warts; in about half of the warts malignancy has apparently developed and in some of the animals that have died there are metastases in the lungs. The lungs contain much dust and in some cases there is evidence of primary inflammatory reaction in the air-passages with new cell-formation, the significance of which cannot be interpreted at present. In another experiment in which the dusted mice have also been exposed to carbon monoxide gas—to imitate motor exhaust gas—there is a similar result; 10 out of 29 mice at present reveal tar warts and in 4 of them there is evidence of malignancy. The carbon monoxide does not affect the development of warts, &c., apart from some retardation.

The dusting did not affect the general health of the animals whose rate of growth and weight compared very favourably with the controls. In a few animals the hair became scanty in parts of the skin but this does not appear to control the development of warts or malignancy. Taking all the mice together, the warts are distributed over the head, face, and back with an element of chance as to where they will arise.

In the lungs of the guinea-pigs and rabbits which have died there is much dust usually arranged very neatly in circular spots indicating that the lymphatics lead to these areas or that these areas are at the ends of the more direct air-passages as suggested by Dr. H. S. Willis.[1] The tracheo-bronchial nodes also contain much dust, but there is so far no evidence of cancer either of skin or lung in the guinea-pigs and rabbits; these experiments are being continued, but the dusting has been stopped because the lungs now contain much dust.

[1] Amer. Rev. Tuberc., 1921, v., 189.

CONCLUSION

Road dust, containing about 2 per cent. of tar, is potent for mice, causing cancer of the skin with metastases sometimes in the lungs. So far as the experiments have gone the skin of the mouse appears to be more sensitive to the carcinogenic action of the tar than are the lungs when exposed to the dusty atmosphere.

RICHTER'S HERNIA AND CARCINOMA OF THE COLON

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THE following case is instructive in that it illustrates the value of routine examination of the abdominal contents whenever an incision large enough for the purpose has been made.

A female, aged 50, was admitted to the Bristol Royal Infirmary on August 22nd, 1933, with a history of intermittent abdominal pain of four days' duration. The initial attack of pain had soon been followed by vomiting, which recurred at various intervals during the succeeding days. There was no history of bowel irregularity save constipation for 36 hours before admission. The temperature was 99° F. and the pulse-rate 100.

On *examination* the epigastrium was tender, with a suspicion of increased muscular resistance. There was no visible distension of the abdomen. A small lump about the size of a walnut, and exquisitely tender, was palpable in the region of the left femoral ring. The patient then volunteered the information that she had had the swelling for years, but as it used to "come and go," she had not paid any attention to it. She had noticed, however, that it had become tender and larger since the onset of the pain and vomiting. The diagnosis of Richter's hernia was made.

At *operation* an incision was made along the medial half of the left inguinal ligament, and the skin and subcutaneous tissues divided in the usual way. During the manipulation of isolating the sac its contents were suddenly felt to slip back within the abdomen, and on opening the sac blood-stained fluid was found. As the vitality of the sac content was uncertain, it was thought advisable to open the abdomen, and this was done through a right subumbilical paramedian incision, after radical cure of the hernia had been performed by the method of Lotheisen. A portion of ileum which had obviously been caught in the femoral ring was found to be quite viable.

Before the abdomen was closed a rapid examination was made of the stomach, gall-bladder, kidneys, genital organs, and large gut. On palpating the sigmoid flexure a small annular carcinoma was found, encroaching on the lumen of the bowel but slightly. With a view to excision later, a transverse colostomy was performed and the abdomen closed. Resection of the sigmoid was carried out three weeks later and the patient made a perfect recovery from it.

It should be a surgical axiom that an emergency operation is undertaken to save life and not necessarily to remove the cause of the condition demanding intervention. It may be argued therefore that routine examination of the abdomen on such occasions is inadvisable, since it involves further shock. Provided, however, that the patient is fairly fit the two or three minutes required for a cursory examination of the abdomen may be well spent. The above case demonstrates this. Had not the peritoneal cavity been examined it is almost certain that the patient would have lost the chance of early removal of her sigmoid growth.

I am indebted to Mr. C. Ferrier Walters for permission to publish this case.

INFRA-RED PHOTOGRAPHY OF THE SUPERFICIAL VENOUS SYSTEM

By Reginald T. Payne, M.S. Lond., F.R.C.S. Eng.
CURATOR OF THE MUSEUM, ST. BARTHOLOMEW'S HOSPITAL MEDICAL COLLEGE, LONDON

THE recent development of the use of infra-red photographic plates has been followed by the application of the method in many different spheres. As yet the medical and biological applications are necessarily few, but already infra-red photography has proved of value in the elucidation of some of the problems of neuro-histology in connexion with the microphotography of nerve-cells and axis-cylinders.[1] The observations recorded in the present paper have been made during the past six months in the investigation of the superficial venous system. The method has been used experimentally to determine whether or not it was of any value in this direction. The photographs shown were taken using two 500-watt electric lamps as the source of illumination, and the infra-red ones using Ilford infra-red plates and filter. The illustrations of the cases described below give some idea of the results which can be obtained.

CASE 1.—The patient was a ward-maid of 28, in whom the development of varicose veins corresponded to the first appearance of menstruation at the age of 12, since when the disorder had been progressive. The ordinary plate illustrated in Fig. 1 does not do justice to the actual clinical state of affairs. On the other hand the infra-red photograph (Fig. 2) shows the degree of dilatation of the dermal and subcutaneous vessels, and shows up many which clinically could neither be seen nor felt.

CASE 2.—The patient was a woman of 39 in whom varicose veins developed about the age of 21; they had been progressive in both legs since that time. Both limbs showed dilatation and tortuosity of the whole internal saphenous venous tract below the middle of the thigh, more marked on the right than on the left side. Fig. 3 shows the condition as seen with ordinary plates. The corresponding infra-red photograph illustrated in Fig. 4 is interesting in connexion with the cure of varicose veins by means of sclerosing injections, the prognosis after such injections, and the question of true or false recurrences. Idiopathic varicose veins can always be cured with sclerosing injections, and personally I am very sceptical about the so-called true recurrences due to recanalisation of the thrombus. On the other hand what cannot be cured by injections or any other means is the "soil," and Fig. 4 shows to some extent the "soil" which cannot be recognised clinically. In this case almost all the small and tortuous vessels present over the back of the thigh, the popliteal space, and the upper part of the calf were imperceptible to the eye or to touch. Yet obviously many of them are already varicose and ready to dilate at some future date.

FIG. 1 FIG. 2

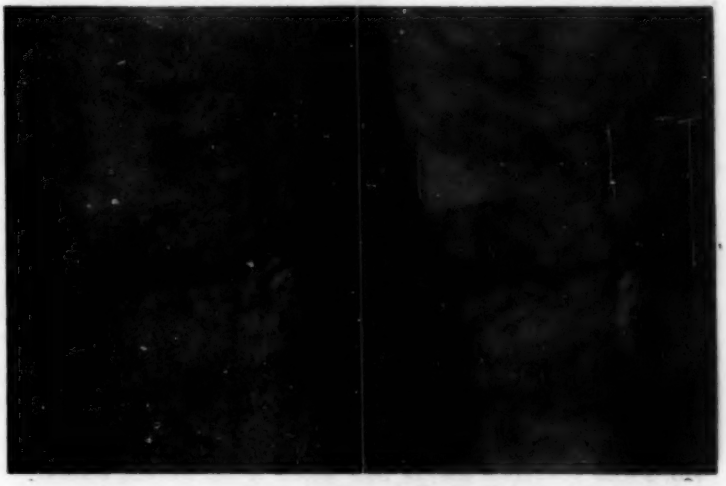
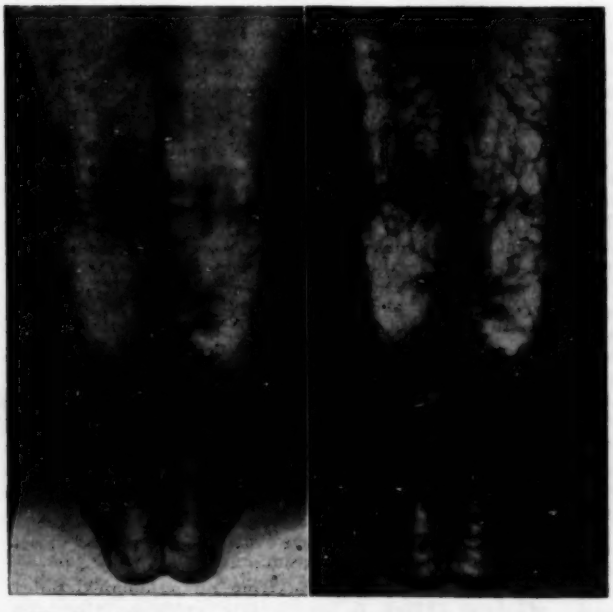


FIG. 1 (Case 1).—Back of thigh and leg, showing varicose veins.
FIG. 2.—The same, photographed using infra-red plates.

[1] Blair, D. M., and Davies, F.: THE LANCET, 1933, i., 1113; and 1933, ii., 801.

FIG. 3 FIG. 4



FIGS. 3 and 4 (Case 2).—Photographs from a case of varicose veins. Ordinary plate on left; infra-red plate on right.

CASE 3.—The patient was a man of 51. Eight years previously a traumatic ulcer on the right shin had been followed by thrombosis of the deep veins of the limb, and later by the development of dilated and varicose superficial veins on that side. A year later he had an attack of phlebitis in these veins. On Feb. 7th, 1933, a further attack of phlebitis occurred in the varicose veins of the upper part of the right calf extending to the upper third of

the thigh, and this was followed by a small pulmonary embolus with cough and hæmoptysis. Shortly after this the phlebitic process spread to the deep vessels of the other limb. When seen in November, 1933, the patient was getting gross evening œdema of both lower limbs, and on examination it was found that this extended to the level of the knees. A few small rather prominent superficial veins could be made out in the groins converging towards the saphenous openings on the two sides. Clinically these were barely visible and could just be appreciated on palpation. No prominent varicose vessels could be made out over the abdomen. The infra-red photograph illustrated in Fig. 6 shows the marked development of the collateral venous circulation in connexion with the vessels of the groin and the abdominal wall. Such a state of affairs is not present in the normal patient.

FIG. 5 FIG. 6

FIG. 5 (Case 3).—Patient suffering from œdema of legs following bilateral deep femoral thrombosis.
FIG. 6.—The same, photographed with infra-red plates, showing development of collateral circulation.

CONCLUSION

The illustrations show that using infra-red plates it is possible to get photographic demonstrations of superficial veins which are not recognisable either clinically or by means of ordinary plates. As yet I find it very difficult to predict how any given case will react to infra-red photography, but I put forward the following tentative suggestions: (1) the method is more successful in general in women than in men, probably owing to their thinner skins; (2) normal subcutaneous veins do not show up at all sharply, but the method will demonstrate dilatation or tortuosity of dermal or subcutaneous vessels; (3) very large tortuous varicose veins are not shown to the extent one would imagine, possibly owing to associated changes in the vein wall; (4) the method may have applications in connexion with the prognosis after injection of varicose veins, and in the investigation of collateral venous circulations; (5) it may be used analytically in varicose ulcer cases; and (6) it may be capable of extension in conjunction with the use of intravenous dyes.

My thanks are due to Miss Fretter, of the St. Bartholomew's Hospital Medical College photographic department, for the care with which she has carried out the photography.

CONGENITAL STENOSIS OF THE AORTIC ORIFICE

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Cases of this kind are sufficiently rare and interesting to warrant a brief note.

The child was a female aged 3 days. Her parents were apparently healthy. One brother had died rather suddenly at the age of 4 of heart disease, said to be congenital. Another child had died at the age of 9 days of a similar condition. The child, delivered with forceps at birth, appeared to be perfectly normal and healthy for the first few hours of her life. She then began to suffer with a gradually increasing dyspnœa, so that her respirations became gasping and difficult to count. At the same time some degree of cyanosis became apparent. It was thought that a systolic murmur was present, but owing to the incessant crying and rapid respirations, it was impossible to be sure. The dyspnœa became more intense and the cyanosis gradually deepened, so that the child died of respiratory failure on the third day after delivery.

Post-mortem.—The body was that of a normal child and presented no external malformation. The integuments were cyanotic. On opening the thorax it was observed that the heart was greatly enlarged, and occupied a large part of the left pleural cavity, the left lung being atelectatic on account of compression. The pericardium contained a small amount of straw-coloured fluid. The anterior surface of the heart was largely formed by the right ventricle, but the border of the left ventricle was rounded and prominent. The right auricle was dilated. The aorta was slightly smaller in diameter than the pulmonary artery. The pulmonary artery, after giving off a right and a left branch to the lungs, became continuous with the descending aorta by means of a very widely dilated ductus arteriosus. (Fig. 1.) Just beyond the origin of the left subclavian artery, and at the normal site of insertion of the ductus arteriosus, the aorta was definitely constricted to about a third of its original diameter, thus exhibiting a moderate degree of coarctation.

On opening the heart it was found the right ventricle was slightly hypertrophied and considerably dilated, with walls 4 mm. thick. The left ventricle was greatly hypertrophied, with walls 10 mm. thick. The cavity of the left ventricle was large, and its endocardial surface smooth and glistening yellow, showing marked fibrous thickening. The septal wall, which was smooth and devoid of columnæ carneæ, was particularly reminiscent of the fibrous wall of the heart sometimes seen in cardiac aneurysms the result of an infarct.

The mitral and tricuspid valves were normal and healthy. It was just possible to pass a bristle through the aortic orifice into the aorta. Further dissection showed that there was a fibrous diaphragm at the site of the aortic valves. (Fig. 2.) This was thick and hard and was pierced by a minute opening. It was impossible to determine if this was the result of fusion of the cusps due to some fœtal inflammatory process. The cusps could not be differentiated. There was no narrowing of the conus of the aorta. Both coronary arteries arose from the aorta just above this diaphragm. The left auricle was small and communicated with the right auricle by a patent foramen ovale. There was no defect of the interventricular septum.

This case is interesting from an ætiological point of view. There is no definite evidence that the stenosis of the aortic orifice was due to a fœtal endo-

carditis. The presence of some degree of coarctation lends support to the view that both lesions are the result of a purely developmental abnormality.

In this connexion the fact that two brothers have died of congenital heart disease, one at nine days and the other at four years, suggests that there may be some familial tendency to congenital heart disease. The familial occurrence of congenital cardiac abnormalities is rare. Rosler,[1] in a survey of 60 cases, could find no evidence of familial occurrence. In a series of 148 cases which I have observed there are two families in which a brother and sister have congenital heart disease. Congenital heart disease in twins has been recorded by Shirley Smith [2] and others.

The circulation in this case was maintained by the right ventricle through the pulmonary artery and a widely patent ductus arteriosus continuous with the descending aorta. Further relief to the circulation was given by a patent foramen ovale. The ascending portion of the aorta acted principally as an ampulla from which the coronary arteries originated. Apparently some small amount of blood managed to pass through the foramen at the aortic orifice. This would in part explain the marked hypertrophy of the left ventricle. If the aortic orifice was completely occluded then a small left ventricle and a much dilated and hypertrophied right ventricle might be expected. This was so in Case 26 of Evans,[3] which was somewhat similar to the case I record, except that there was complete atresia at the orifice and no stenosis at the isthmus. Abbott [4] states that in extreme cases of aortic stenosis and in aortic atresia "the left ventricle is aplasic, with greatly thickened walls presenting a true eccentric hypertrophy, while the right ventricle is so greatly hypertrophied and dilated as to encircle the left at its apex, forming a recess-like cavity below the latter." Although in the above case the stenosis was of the severest type the cavity of the left ventricle was relatively large and the right ventricle had not a similar degree of hypertrophy and dilatation as suggested by Abbott.

FIG. 1

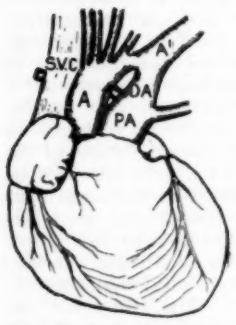

FIG. 2

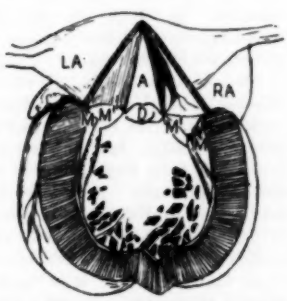

FIG. 1.—Heart unopened. A, aorta. A', descending aorta. PA, pulmonary artery. DA, ductus arteriosus. S.V.C., superior vena cava.

FIG. 2.—Heart opened from left ventricle posteriorly. The posterior and anterior mitral cusps have been severed and the posterior and anterior walls of the left auricle have been cut, the latter into the aorta. A, aorta. D, fibrous diaphragm. LA, left auricle. RA, right auricle. M and M', mitral cusps severed.

These cases are rare. A search of the literature has failed to reveal one in which orificial stenosis of the aorta was combined with isthmus stenosis. The case of Pilod and Hugonot [5] in a man aged 20 would appear to be one of subaortic stenosis with isthmus stenosis. Search has also failed to reveal any mention of the extensive fibrotic and degenerative change in the walls of the ventricle such as this case showed. Bland, White, and Garland,[6] in a recent paper on abnormal origin of the coronary arteries, in addition to their own case quote one of Heitzmann's[7] in which there was diffuse endocardial thickening of the septum. Heitzmann was impressed by the striking similarity of the changes in the myocardium, in his case of a three and a half months' old child with a left coronary artery arising in the pulmonary artery, to those seen in older persons with fibrous tissue replacement after an infarct of the heart. In the case recorded above, the septal wall is thinner than the other walls of the ventricle. It is suggested that the fibrotic changes in this case are due to a rather stagnant supply of blood entering the coronary arteries from the ampulla from which they are derived.

The duration of life in these cases of severe orificial stenosis is short. Most of the children die within a few days. The oldest is that of Simmon,[8] who lived to the age of 16 weeks.

My thanks are due to Dr. J. H. Ward, of Keelby, for the clinical notes and the opportunity to perform a post-mortem examination.

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PARATYPHOID B IN A CHILD AGED FOUR MONTHS

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INFECTIONS with organisms of the typhoid group are probably commoner in children than is generally supposed, but the following case is unusual in that the child was only 4 months old.

The actual date of onset was indefinite as there had been frequent and relaxed stools for a month before admission on Nov. 28th, 1933. On Nov. 24th, however, he started vomiting after each feed and the mother noticed that the abdomen was distended and that he cried when touched. He became very restless and fretful and on the 25th was found to be feverish. On admission on the 28th his temperature was 101° F. and the pulse-rate 142. The abdomen was distended and the spleen was palpable. No abnormal signs were present in the heart or lungs and there were no rose spots, although some eczema of the face and head had been present since the age of nine weeks. On the following day the Widal test on the patient's serum was performed and was returned positive for *Bacillus paratyphosus* B in dilutions up to 1/250+, no agglutinins being present for *B. typhosus* or *B. paratyphosus* A.

The temperature rose to 104·6° on the day after admission and for the first week it kept about this level, the morning and evening range being from 103°–104°. He took his feeds fairly well with only occasional vomiting and passed one or two green stools daily. The stools and urine were negative on culture for *B. paratyphosus* B. After the first week the spleen could no longer be felt and the temperature range improved and he seemed to be making fairly satisfactory progress. However, on the tenth day after admission the temperature range became higher, the pulse uncountable, and the motions more

frequent. The child became weaker and died on Dec. 12th, fourteen days after admission.

At post-mortem examination Peyer's patches were found to be much swollen, particularly at the lower end of the ileum, the peritoneal coat of the intestine over them showing some inflammatory reaction. There was no evidence of hæmorrhage or perforation. The spleen did not appear to be enlarged and was fairly firm. The mucous membrane of the stomach was congested and showed small petechial hæmorrhages.

The main features of the case were that: (1) diarrhœa was not a prominent feature and was not more severe than in an ordinary infective enteritis; (2) the spleen was early felt; (3) there were no rose spots; (4) the Widal reaction was positive; and (5) the urine and stools were negative on culture. The source of infection was apparently the child's father, who had already been admitted to a neighbouring hospital and found to have paratyphoid B.

I am indebted to Dr. Alan Moncrieff for permission to publish this case.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTIONS OF EPIDEMIOLOGY AND CHILDREN'S DISEASES

AT a combined meeting of these sections held on Jan. 26th, Dr. J. D. ROLLESTON being in the chair, the subject of discussion was the

Ætiology of Acute Rheumatism and Chorea

in relation to social and environmental factors.

Dr. J. ALISON GLOVER, in introducing the subject, took as his basis No. 187 of the Special Report Series of the Medical Research Council issued in 1927 on Social Conditions and Acute Rheumatism. This investigation included the medical and social histories of 721 rheumatic families, 200 control families, and 2000 children living in poor-law schools; and the possible social factors investigated included maternal care, exposure, sleeping accommodation, clothing, cleanliness, distance from school of the home, birthplace, occupation, and income of the parents; the medical particulars of course embracing familial incidence and heredity, the familial incidence of sore-throat and throat conditions, and tonsillectomy. Housing sites and accommodation were specially noted. Yet the outcome was declared to be largely negative. A remarkable finding was a low incidence of rheumatism in the children living in the poor-law residential schools, perhaps because of better general hygiene in comparison with that of children of the same class living in poor homes. But the social and environmental conditions as well as the bacteriology and the ætiology of acute rheumatism still formed one of the enigmas of preventive medicine. Still, poverty, urbanisation, overcrowding, malnutrition, and dampness were associated factors of undoubted significance. A possible factor not dealt with in the report was diet.

Gray Hill and Allan seemed to have shown clearly that no "rheumatic type" of child was distinguishable by bodily conformation, physical standard, or pigmentation. The Child Life Committee of the Medical Research Council, under whose auspices Report No. 187 was issued, stated that if hospital patients were divided into three classes according to their degree of poverty, the poorest of them—i.e., the destitute poor—showed a lower rheumatic incidence than did the other two. But despite this finding Dr. Glover believed that the incidence of acute rheumatism was in direct proportion to the degree of poverty.

The most hopeful recent advance was that on the ætiological relationship of *Streptococcus pyogenes* to acute rheumatism. The work of Coburn in the United States had shown a direct correlation between the geographical and seasonal distribution of hæmolytic streptococcal throat infection and acute rheumatism; also that poverty and unhygienic conditions favoured both throat trouble and acute rheumatism, and bacteriological investigation demonstrated a close association between these in susceptible persons. Coburn had also shown that those who escaped respiratory disease remained free of rheumatic manifestations, and that most of those who, having had rheumatism, developed a pharyngitis of streptococcal nature had a recurrence of rheumatism soon after the throat infection.

Dr. Glover also dealt with some epidemics in semi-closed communities of various kinds, in which the cases of acute rheumatism were associated with an epidemic of tonsillitis due to one serological strain of hæmolytic streptococcus. Paul and Salinger had made a study of 15 rheumatic families, and they found that "non-specific" respiratory infections occurred before the appearance of characteristic acute rheumatism. They also found that the health of the parents was not so good in rheumatic as in control families. Dr. Glover considered that the results of investigations in recent years did not justify a feeling of pessimism as to the future.

Dr. REGINALD MILLER said that of the causative factors of juvenile rheumatism, three sets emerged: (1) the bacterial cause circulating in the blood stream; (2) the predisposing factors; and (3) the exciting factors. In 1923 he put forward a plea for the investigation of the causes of the class incidence of juvenile rheumatism. The profession possessed a mass of knowledge of the natural history of the disease, and that was probably in the main right. It was agreed that the disease was essentially one of the poorer classes, but he questioned whether it could be regarded as a true poverty disease in the sense that actual poverty and squalor determined its class incidence, and this view was supported by the figures which showed that it was in the two better-circumstanced of the three divisions of hospital class children that the incidence was highest. Dr. Miller did not regard even damp as the determining factor, though damp and cold were exciting factors. To move children of the rheumatic stratum from their homes and transfer them to poor-law boarding schools sufficed to prevent the appearance among them of rheumatic infection. He did not feel very clear as to the position on the subject occupied by hæmolytic streptococcic infection. If it were proved that the causative agent of juvenile rheumatism is a hæmolytic streptococcus, there would be need for a considerable rearrangement of prevalent ideas; but more evidence than was now available would be needed to establish that view. It was well known that epidemic sore-throats would activate rheumatism. With regard to allergy, he agreed with W. Sheldon that if it were known what was happening in the interval between the throat infection and the occurrence of systemic rheumatism, much of importance would be revealed in the pathogenesis of carditis. It was in connexion with this latent period between the two that Dr. Miller longed to be able to accept some explanation involving

allergic reaction, as suggested by Schlesinger, Macdonald, and others. One proposition was that an infectious sore-throat might set up juvenile rheumatism, though one of these was due to a hæmolytic, the other to a non-hæmolytic, streptococcus. It had long been known that epidemic sore-throats such as were usually associated with hæmolytic streptococcal infections could at least unmask or reactivate rheumatism; it was not so certain that it could originate the disease. Could it be held, he asked, that apart from outbreaks of rheumatism secondary to outbreaks of epidemic sore-throat, the ordinary seemingly sporadic case of juvenile rheumatism was set up by latent or accumulating infection by hæmolytic streptococci? If this were proved it would be a consideration of great importance. The British Medical Association report seemed to have been right in saying that juvenile rheumatism was essentially a disease of children of the artisan class who lived in damp houses in industrial towns, attending a public elementary school under compulsion, and suffering from infected tonsils. But knowledge at present did not justify the arraignment of any single factor.

Dr. W. S. C. COPEMAN thought it most probable that acute rheumatism was an infection, and if so, the importance of secondary factors was not lessened, as they could modify the clinical course of the disease. Soil, climate, barometric variations, wind, degree of damp, temperature, poverty, ventilation, and overcrowding all had their importance. He suggested that the physiological manifestation of the rheumatic diathesis lay in an abnormality of the heat-regulating mechanism of the skin, and hence the failure of rheumatic children to adapt themselves climatologically to their environment. We were exposed to natural climate for only a fraction of our lives; during the remainder of the time we lived in a climate of our own choosing, the surroundings lying between the inside of the clothing and the surface of the skin, or at night, the bedclothes. To eliminate a layer of moisture from the skin surface, the clothing must be porous and also heat-retaining. Often in the kind of cases under discussion the dietetic factor was operative, and this might not merely mean a defective calorie intake, but, as Dr. Warner suggested, it might extend back to the beginnings of the disease. It was difficult to see how overcrowding could be a factor, as it was invariable below a certain poverty level. He thought the comparatively minor ætiological factors should be more studied; there still remained a great field of clinical research on the subject.

Dr. E. C. WARNER said that in discussions on this subject it had usually been assumed that rheumatic disease in childhood was primarily of infective origin. This was true of rheumatic carditis, but not demonstrable as to all rheumatic manifestations. In the case of chorea without carditis there was a considerable amount of evidence against the hypothesis of an infective encephalitis. In these cases, too, the sedimentation-rate did not show any rise from the normal, but immediately on the supervention of carditis—even before its clinical evidence—the sedimentation-rate rose. Some of the manifestations of acute and even subacute rheumatism might be, he thought, non-bacterial in origin. A study of the class and familial incidence of rheumatic disease and of the biochemical evidence suggested that a metabolic factor played an important part. In many rheumatic families inquired about the total calories of food were ample—i.e., an average of 3250 per man-value per day; nor was there evidence of deficiency of protein. But among rheumatic children the consumption of animal fat, in the form of fresh milk and butter, was diminished in comparison with that consumed by the controls, chiefly because rheumatic children disliked those foods. Rheumatic children, however, showed a fondness for potatoes. It emerged from an inquiry at a public school that on a diet rich in both animal fats and other constituents there was a marked decrease in rheumatic disease. An inquiry in regard to chorea showed that the calcium content rose in the cerebro-spinal fluid, while the phosphorus fell. Many observers had noted a history of a period of general debility in those developing rheumatism or chorea; this debility may have had a dietetic cause.

Dr. R. L. J. LLEWELLYN put forward the view that the cause of acute rheumatism lay mainly in the skin, only secondarily in the joints and bones. In the complex adaptive processes of the body the cutaneous glands, especially the sebaceous glands, participated to a marked degree; in infancy and young childhood those glands were practically inactive, hence there was a lack of protective and lubricating sebum, with the resultant sensitivity to dampness and humidity, and deficient heat retention. The chief chemical constituent of sebum was cholesterol, and he believed the hereditary make-up largely determined whether or not a child would escape rickets or acute rheumatism.

Dr. C. BRUCE PERRY said that Dr. Warner's remarks on the normal sedimentation-rate of the blood in cases of uncomplicated chorea were closely parallel to his own findings, but as Dr. Warner had said, the onset of a clinically recognisable carditis might be preceded by a rise in the sedimentation-rate. With regard to the investigation into rheumatism occurring in Bristol and the three surrounding counties, a closer study of the figures for Bristol itself had shown that in the three years (1927–30) there were greater differences of incidence in respect of fresh cases of rheumatic heart disease between the various parts of the city than between Bristol as a whole and the three counties. The city ward with the highest incidence had 3·7 cases of rheumatism per 1000 of the population, whereas the lowest incidence was 0·15 per 1000 (in Clifton and Redlands). If a concentration of hæmolytic streptococci played a very important part in this striking distribution, the incidence of scarlet fever over the same period should show a parallel distribution; this, however, was far from being the case. Diphtheria had a spread similar to that of scarlet fever. The Bristol inquiry seemed to show that it was not the infection itself which was so vitally important, but the soil, the child's diathesis, and his environmental conditions which allowed an infection of the disease to gain a footing.

Prof. J. A. NIXON, commenting on the fact that the incidence of acute rheumatism in poor-law residential schools was low, said this was so also in institutions for mental defectives, and also with regard to respiratory infections generally. Yet there had been a number of outbreaks of scarlet fever in those institutions.

Dr. LEONARD FINDLAY said probably most medical men were agreed that acute rheumatism was an infectious disease, and if that were conceded it would be astounding if social conditions had no influence on its incidence, either by favouring transmission or by undermining the general health of the individual patient and so rendering him more susceptible to attack. But the specific cause of the disease was still to seek; he did not think the causal culpability of the hæmolytic streptococcus had been made out, despite Dr. Glover's arguments. The illustrations supporting the original work of F. J. Poynton and Alexander Paine on rheumatism showed many forms of organism

in profusion, not only in the endocardial but also in the joint lesions. There was some other factor; was it a symbiosis, or was it simply a matter of environmental influence? That Dr. Warner should have taken chorea as a manifestation of acute rheumatism was not very happy, as the speaker regarded it as one of the least of the rheumatic presentations. One thing which had been abundantly made out in all the inquiries was the great need among the poor of decent and sound houses to live in.

Dr. E. W. GOODALL asked as to the association of tonsillitis with the cases of acute rheumatism referred to by Dr. Glover. In the usual way one would not expect acute rheumatism to be infectious from one patient to another.

Dr. GRAY HILL said that among the 3000 inhabitants of the hospital where he worked at Carshalton there were seldom any manifestations of rheumatism with the exception of chorea. It was on a chalk soil. The children lived under very good hygienic conditions, and the diet was generous. His view was that acute rheumatism was largely due to bad environmental conditions.

Dr. GLOVER, in reply, said that practically all the cases of acute rheumatism he had been referring to had had tonsillitis. He did not agree that any infectious disease would activate acute rheumatism; for the latter to develop he considered there must be an infection with hæmolytic streptococci. A high tonsillectomy rate did not increase the resistance to the invasion by streptococci; the influence was the other way. He thought that an inquiry worth carrying out would be to take a number of rheumatic families and a number of control families and keep a record of the illness of every member, week by week, in parallel lines, and, in addition, to take a weekly throat swab.

Dr. REGINALD MILLER said he thought it was important to study communities which were free from rheumatism, and that was done by the B.M.A. Committee. He agreed that the inhabitants of institutions for mental defects were notoriously free from rheumatism and heart disease, and it formed one of the reasons for thinking that the wear and tear and exposure incidental to compulsory school attendance was a factor in the production of rheumatism. It was a serious matter for anyone at this date to cast doubt on the infective origin of acute rheumatism.

SECTION OF UROLOGY

AT a meeting of this section held on Jan. 25th the chair was taken by Mr. A. CLIFFORD MORSON, the president, and a discussion on the

Factors Influencing Renal Function

was opened by Dr. T. IZOD BENNETT. The factors, he said, were numerous and complicated. They might be classified as intrinsic or anatomical changes, and extrinsic, including mechanical, circulatory, lymphatic, and nervous groups. Bright's disease belonged to the first group and would be better known by the term "ischæmic nephritis." Cases of high blood-urea with high blood pressure were familiar to every physician; blood-pressure estimation should form part of every urological investigation, both to avert catastrophe and to add to knowledge of the subject. There were cases of temporary ischæmia sufficient to produce severe change in renal function. Dramatic disaster occasionally followed passage of an instrument; such cases were mysterious and rare but were probably due to a reflex ischæmia resulting in suppression. Cold sponging might cause suppression of urine; cold on the skin might be the origin of the nephritis of sailors and others exposed to bad weather. Far more numerous were the changes in renal function due to alterations in the quality of the blood reaching the kidney. Infections headed the list, followed by the various poisonings, which sometimes produced specific lesions. For example, mercury affected the convoluted tubules only while the effects of lead were seen mainly in the glomeruli.

Changes in the relative normal constitution of the blood played an important part. The hormone content of the blood profoundly influenced urinary function. Alterations in renal function brought about considerable change in the blood and, conversely, if the relative concentration were changed a diminution in the secreting capacity might result. The deciding factor in all these cases was probably the establishment of an oliguria; if the water-supply were reduced nitrogen retention would appear and would then still further interfere with renal function, possibly pushing the patient into uræmia. A salt-free or high-protein diet, alkalosis, severe vomiting with depletion of chloride, or intestinal obstruction might produce this state. Post-operative suppression of urine was a similar condition. The blood-urea always rose after operations, and if there was a slight impairment of the kidney the resulting nitrogen retention might be fatal. Post-operative vomiting might be a vital factor. Prophylactic normal saline intravenously was said to have the greatest value in preventing such catastrophes.

No adequate estimate of renal function could be formed without blood and urine analysis. Before any evidence of nitrogen retention was available the kidney might show failure to concentrate urea. Important information about the urine was: the specific gravity, urinary flow, result of the water test and of the urea-concentration test (MacLean), and of the urea-clearance test of van Slyke. The urea-clearance test was far more valuable than any other single test, but it only represented the patient's renal function at one particular moment. It must be repeated at intervals if a fair picture of the kidney were to be obtained. Nor should it replace full analysis of the blood or the other urinary tests.

Another group was the nephrosis group, characterised by œdema and albuminuria. In these the van Slyke test might be normal. A rising blood pressure was ominous. Experience of the van Slyke test in acute nephritis showed that apparent improvements must not be taken too optimistically. Special post-mortem inquiries ought to be held on renal tragedies: careful blood examination before death would show whether the patient died of nitrogen retention, acidosis, or hypocalcæmia, and this information would forewarn the physician on other occasions. Dyes were of very little value as tests of the total renal function. Estimation of the kidney output, coupled with estimation of the intake, might give valuable information. All methods of estimating renal function must give way to careful clinical investigation.

OBSTRUCTIVE LESIONS

Mr. DUNCAN MORISON said that stasis and infection were closely related and often superimposed one on the other. Primary obstructions were most often found at the sites where there was anatomical narrowing: an obstruction near the kidney would more rapidly produce more grave renal impairment than one further away, but there were exceptions—for example, if the kidney pelvis were extrarenal and so could absorb back pressure by expanding. All the lesions produced straining, leading to relaxation

and stasis. Stasis might also be due to neuromuscular dysfunction. Some of the lesions might only be found in the course of routine observation; a kidney might be completely destroyed without symptoms.

Secondary obstructive lesions followed infections and constituted a large group. A typical example was gonococcal infection. Gradual fibrous infiltration of the bladder floor and outlet led to back pressure on the kidneys. In women a corresponding lesion was usually attributed to trauma in childbirth. There was chronic trigonitis and the ridge was pulled down into a U-shape. Resultant ureteritis led to dull suprapubic pain. Influenza, septic foci, and similar upsets might cause urinary infection. The chief sites of ureteritis were at the pelvo-ureteral junction, where the ureter crossed the iliac artery, at the broad ligament, and at the junction with the bladder. The corresponding sites of pain were: just below the ribs at the side; just lateral to the umbilicus, in the iliac fossa, and above the pubes. A ureteritis might be a zone of irritability with attacks of spasm or there might be permanent narrowing with back pressure. Any departure from the normal process of drainage threw a strain on the kidneys. For a time the interference was so slight that tests were uncertain, but there were vague symptoms such as headaches, fatigue, and loss of mental clarity. Symptoms disappeared when the ureteritis was treated. A lateral as well as an end-view urethroscope should be used both for adults and children in order to obtain a clear idea of the lower tract. Whistle-tipped catheters should be used for the upper tract. Intravenous phenolsulphonephthalein tests were useful. Bulb bougies or catheters were necessary for investigating ureteritis. Pyelography was instructive as collateral evidence but less precise than bougies. It was difficult to define exactly what was recoverable and what was permanent impairment.

Dr. CUTHBERT DUKES showed slides illustrating the effects on renal tests of operations, intestinal obstructions, and urinary obstructions. A minor operation on a healthy man might reduce the urea-clearance test from 75 to 50 per cent. for 24 or 48 hours. Severe abdominal operations effected a tremendous alteration for 24 hours; the test might drop from 105 to 15 per cent. The defect was over-compensated by a day or two of over-function afterwards. Intestinal obstruction, in the absence of any kidney disease, might be accompanied by a drop of 10–20 per cent. In a fatal case of paralytic ileus the blood-urea rose steadily, but so did the urine urea, the kidney making a valiant effort to deal with the situation. In uræmia the clearance test fell to about 10 per cent., but in the ileus cases it kept up until just before death. When a patient had urinary obstruction the test fell very low. Different forms of test might be required for the investigation of different types of disease. The urea-clearance test had great scientific and medical interest.

DISCUSSION

Mr. K. H. WATKINS spoke of the phenolsulphonephthalein test, which he had found most useful. Specimens were taken each half-hour after the injection of phenolphthalein. The greater part was excreted in the first half-hour and then the curve fell for two hours. Delay appeared, in cases of obstruction, at the onset, the peak, and the two-hour elimination percentage. An excellent graphic representation of recovery after relief of obstruction could be obtained. The test was simple to carry out; a large volume of water should be given beforehand.

Mr. E. W. RICHES described work on the urea-clearance test in surgical cases. The clinical condition of the patient was the most reliable index of renal function only in extremes; in borderline cases laboratory tests were of value. He had taken 60 per cent. van Slyke test as the index between one-stage and two-stage operations and had not since lost a case. A tuberculous kidney could be removed with quite a low clearance test. When one kidney was absent or functionless the test might still be 100 per cent. It tended to rise after nephrectomy provided the bladder and remaining kidney were healthy. Infection seemed to be the most potent single factor lowering the urea clearance.

Mr. H. P. WINSBURY-WHITE said that there were often operative dangers not reflected in renal function capacity. The tests must be kept in their place; equal consideration must be given to clinical facts. They showed some facts that clinical observation could not reveal. Urinary drainage greatly reduced risks in urinary manipulations and operations. An extremely debilitated patient could be coaxed back by stages to a condition suitable for prostatectomy. The process was well reflected by function tests. The specific gravity charted in relation to meals was a useful piece of information. The concentration test was not nearly so reliable as the water test.

Dr. GEORGE GRAHAM pointed out the importance of infection in lowering renal function. Alkalosis could be produced by vomiting; alkali treatment for post-operative vomiting was therefore entirely wrong. Intravenous saline, glucose, and insulin or acid administration would save many of these patients. Other cases had an acidosis and could be helped by alkalis. The acidosis patient often showed air-hunger like that of diabetic coma, but the breathing in alkalosis was very quiet. The alkaline reserve should be ascertained. Whenever acid or alkali were given a check on the blood should be kept. If a patient were practically starved he would excrete 6–7 g. of nitrogen in a day, but would excrete no more if he were given that amount in his diet; equally good results would be obtained, therefore, by giving a certain amount of food in acute nephritis.

Mr. SWIFT JOLY distinguished between reduction in quantity and in quality of renal function. In the former type much less urine was excreted though qualitatively the urine appeared good. In most surgical cases there was reduction in quality but might be increase in quantity. The elimination of water was important in prostatectomy; he always tried to double it before operation. Where there had been a voluntary reduction of intake of fluid, operation was singularly dangerous. The percentage of urea could be ignored, but a good result could be expected if the patient excreted a tenth of the dose given every hour afterwards. The test could thus be done without reducing fluid intake.

LIVERPOOL MEDICAL INSTITUTION

AT a meeting of this institution on Jan. 11th, with Dr. H. R. HURTER, the president, in the chair, a communication on the

Differential Diagnosis of Pregnancy

was made by Prof. A. LEYLAND ROBINSON and Mr. M. M. DATNOW. They pointed out that the physical signs and symptoms of pregnancy might be obscured or simulated so that in all complicated cases clinical methods alone might not suffice for diagnosis, even in late pregnancy. Radiography gave decisive results from the fourth month onwards, but afforded no help before the sixteenth week. In the early weeks

of pregnancy there was great need for a method giving accurate information. A modified Aschheim-Zondek reaction was now being carried out at the Pregnancy Diagnosis Station of the University of Liverpool. Of a total of 706 tests, 373 were positive and 333 were negative; there were three wrong results in the positive group and ten in the negative. Modified reactions were obtained with 170 specimens of urine obtained from patients at the menopause, from women after oöphorectomy, and from others who were in process of abortion. These results were correlated with the changes in the type and concentration of the hormones present in the urine and they afforded valuable help in the differentiation of certain clinical conditions liable to be confused with pregnancy.

In the discussion which followed, Dr. J. W. BURNS said that the value of the Aschheim-Zondek test depended largely on the person who carried it out, the methods he adopted, and the standard to which he worked. There was no doubt that the test had been made more valuable by the way in which it was carried out in the Liverpool pregnancy diagnosis station. The test was by no means infallible, and should be used only as an aid to diagnosis. It was at its best when used to corroborate the clinical findings.

Dr. T. N. A. JEFFCOATE said that the occurrence of doubtful or incorrect Aschheim-Zondek reactions was not always the fault of either the test, the technique, or the technician. Urines for examination were often collected at midday and the concentration of the hormones was at this time much less than in the early-morning specimen.

Dr. J. H. WILLETT said the test was proving a valuable aid to diagnosis in such conditions as chorion-epithelioma and intra-uterine death, and he thought that continued research would lead to a further reduction in the admitted, if small, percentage of errors.

Mr. BRYAN MCFARLAND gave a cinematograph demonstration of orthopædic cases.

Simpler Pathology

At a pathological meeting of this institution on Jan. 18th, with the president in the chair, Prof. J. M. BEATTIE read a paper entitled a Plea for a Simpler Pathology. He maintained that the fundamental facts of disease processes are being neglected and emphasis is being laid on theories, elaborate classifications, and obscure pathological details. Specialised research in pathological institutes and the urge towards publication were largely responsible for this unfortunate state of matters. Teachers of pathology were not now doing that "grinding" course which was essential for real training in every branch. In this "grinding" stage the work did not lend itself to publication, and was therefore of no use to the man who had to present a long list of papers before he could be successful in applying for a teaching post. In making such appointments real training or teaching ability were secondary considerations. In giving examples of specialisation and the mania for classification Prof. Beattie referred to the literature of the reticulo-endothelial system, the classification of diseases of the kidney and of tumours of the brain. No two authors agreed about the definition of the reticulo-endothelial system, and the speaker held that the differentiation between cells should be based on an examination of the living cell and not on the stained, dead, and distorted cell. He saw no special value in the classification of diseases of the kidney and none at all in the elaborate classification of gliomata. What the student or practitioner should know was what changes are produced in the various organs as the result of toxic agents, chemical and other poisons. The clinician should be able to picture these conditions but not necessarily to give them a name. It was better to have studied the simple beginnings of disease and the changes which followed and which produced the more complicated pathological picture, rather than to be able to describe the complicated picture without a knowledge of how it was built up.

EDINBURGH OBSTETRICAL SOCIETY

AT a meeting of this society on Jan. 10th Dr. WILLIAM HAMILTON read a paper on

Midwifery in General Practice

Analysing 1409 midwifery cases attended in a partnership practice from 1919 to 1933, he said that on the average each received 12·4 visits between the beginning of the eighth month and the end of the puerperium. Chloroform was always given at the end of labour, and in addition heroin and hyoscine were given fairly frequently to primiparæ and occasionally to multiparæ. Pituitrin had been administered to 34 per cent. of primigravidæ and 42 per cent. of multiparæ, and no harm from it had been observed. Its use had permitted a more free administration of anæsthesia without compelling recourse to delivery by forceps, had diminished the forceps-rate amongst multiparæ, and had had a beneficial effect in securing a rapid and physiological third stage. In only three cases had manual removal of the placenta been required. Of the 1434 fœtuses 17 per cent. were delivered operatively, the operative delivery-rates being as follows:—

	Primip.	Multip.
Occipito-anterior	33%	8·7%
Persistent occipito-posterior	88%	43·0%
Breech	43%	46·0%

Severe laceration during delivery was confined to primigravidæ and very largely to persistent occipito-posterior and breech cases. Amongst multiparæ, whatever the presentation, the laceration-rate was lower in the operative than in the spontaneous cases. Intranatal deaths and neonatal deaths actually or possibly due to dystocia were as follows:—

	Primip.	Multip.
Occipito-anterior	3·6%	0·6%
Persistent occipito-posterior	23·5%	5·0%
Breech	14·3%	11·3%

The actual admissions to hospital for medical and obstetrical reasons were: antenatal, 1·2 per cent.; intranatal, 2·4 per cent.; puerperal, 1·3 per cent.

The technique used in delivery, Dr. Hamilton said, was a compromise between what was theoretically desirable and what was economically, domestically, and professionally possible, and the results in his opinion showed that there is no positive correlation between elaborate technique and the prevention of maternal sepsis. Lysol was the only antiseptic employed. The infection-rate was slightly higher in operative than in spontaneous childbirth, but the reverse was true of occipito-anterior cases, both in primigravidæ and multiparæ. Severe puerperal sepsis was confined almost entirely to women who were delivered spontaneously, and in the five fatal cases of puerperal sepsis delivery was spontaneous, without laceration, and with a minimum of vaginal examination or with none. From these and other facts the speaker was compelled to conclude that the occurrence and severity of puerperal sepsis depended

very largely on factors peculiar to the woman herself. The maternal death-rate in the whole series of 1409 cases was 6·5 per 1000.

In conclusion, Dr. Hamilton discussed the question of maternity services in Scotland and brought forward evidence that maternal mortality-rates in different types of areas did not vary with the nature of the service, and that areas where such service was rendered largely by general practitioners had, on the whole, a lower mortality. He believed it impossible to base a maternity service either on maternity hospitals or on certificated midwives. On the other hand, general practitioner midwifery was at present almost always carried out in circumstances in which equipment and nursing assistance were alike inadequate, and there were improvements which could be made and were at the same time economically practicable. In short, the results of general practitioner midwifery, though good, might be better if the practitioner were properly supported by the department of health and the public health authorities. No advance towards the solution of the problems of maternal mortality was possible without the proper utilisation of his services.

CANCER OF THE LARYNX.—In the account of a meeting of the R.S.M. section of radiology on Jan. 19th which appeared in our last issue Dr. Douglas Webster is reported as saying that of 61 cases of cancer of the larynx treated by Holfelder *over half* have been free from recurrence for two years or more. The words italicised should read "probably more than a third."

REVIEWS AND NOTICES OF BOOKS

Four and a Half Years

By the Right Hon. CHRISTOPHER ADDISON, P.C., M.D., F.R.C.S. Vol. I. London: Hutchinson and Co. 1934. Pp. 297. 18*s*.

THIS is the first volume of Dr. Christopher Addison's personal diary which will, when completed by a second volume, extend over the four and a half years from June, 1914, to January, 1919. The present instalment takes us up to the end of 1916 and gives full reasons for the responsible positions in State affairs which he occupied during the war and the immediately succeeding period. The prominence of these activities has probably obscured two facts, first that Dr. Addison, before the duties of public life absorbed his energies, was already well known to the medical profession as an anatomist, and secondly that his political career before the war was largely dictated by his membership of the medical profession and was crowned by his appointment as the first Minister of Health.

As anatomist, Dr. Addison has been lecturer at St. Bartholomew's Hospital, professor at University College, Sheffield, examiner at Cambridge and London, and a distinguished contributor to the proceedings of the Royal Society and the *Journal of Anatomy and Physiology*. While connected with St. Bartholomew's his radical political creed appealed to a large North London constituency, and some four years before the war he became M.P. Then, during the protracted negotiations attending the passage of the National Insurance Acts, he was brought into close contact with Mr. Lloyd George, to whom at one time he acted as secretary. In the difficulties which arose between Mr. Lloyd George and the medical profession with regard to the working of that Act, Dr. Addison was of the highest assistance both to the Minister and to the representatives of his own profession; there is little doubt that as an intermediary he was responsible for enlightening his chief as to the true position of medical work under the drastic innovations planned. So that at the outbreak of war he was already recognised as the possessor of the valuable qualities of industry, fairness, and flexibility.

From the commencement of hostilities until the close of 1918, or a little later, he was included always in the Government personnel at the Board of Education, then at the Ministry of Munitions, and finally at the Ministry of Reconstruction. The diary takes the form of a detailed record of his work and personal contacts. In the latter case he is frankness itself. He was behind the scenes throughout, and was brought into the closest touch with those around whom the principal activities of the momentous years centred. Some of the resulting impressions may come as surprises, but for the most part what Dr. Addison notes, as an inside reporter, corresponds very much with the views generally held. Though the author is a medical man there are few or no detailed allusions to any of the many medical sides to the conduct of the war, but Dr. Addison's political medical work had all been done during the four pre-war years during which he had sat in Parliament and had assisted Mr. George in the elaboration of the various schemes for an improved health service dependent upon the National Insurance Acts.

This instalment of the diary, it will be recognised, ends with the fall of the Asquith administration; in the second volume the record will cover the remainder of Dr. Addison's service as Minister of Munitions and his work as Minister of Reconstruction. Presumably an index will then follow; its absence in the first volume is not compensated for by the detailed chapter headings.

Amerika und die Medizin

By Dr. Med. HENRY E. SIGERIST, Professor at the Johns Hopkins University, Baltimore. Leipzig: Georg Thieme. 1933. Pp. 352. M.8.50.

IN the autumn of 1931 Dr. Sigerist was invited as a guest professor to the Johns Hopkins University. For half a year he lectured throughout the States, observing as well as speaking. Not being fitted with the blinkers of a specialist, he was able to take in the whole field of medicine. In this volume, the happy outcome of the tour of inspection, the author's compatriots are given a comprehensive picture of the history of medicine from its humble beginnings to its present-day achievements in America. This is no text-book, admirably complete though it is in certain respects. It is rather a series of historical essays, of the kind one is entitled to expect from a cultured author who has brought to his travels abroad a receptive and philosophical outlook. As he points out, leadership in medicine has passed since 1700 from one great school to another, from Leyden to the British Isles, and thence to Paris and Vienna, and, in the middle of the last century, to Germany. North America being, in the author's opinion, the greatest pioneer in medicine at the present time, he endeavours to show her worthiness to hold this title. Most of his book is devoted to discoveries, movements, and achievements, but one chapter is consecrated to personalities; and here we are given thumbnail sketches of John Morgan, Benjamin Rush, Ephraim McDowell,

Daniel Drake, William Beaumont, Samuel David Gross, James Marion Sims, Oliver Wendell Holmes, Silas Weir Mitchell, John Shaw Billings, and William Osler.

A New Physiological Psychology

By W. BURRIDGE, D.M., M.A. Oxf., Professor of Physiology, Lucknow University. With a foreword by Sir LEONARD HILL, M.B., LL.D., F.R.S. London: Edward Arnold and Co. 1933. Pp. 158. 7s. 6d.

Prof. Burridge is a pioneer and he has the courage to go straight to his point without wasting words with those from whom he differs. His book deserves the careful study of all those who are interested in the relationship of mind and body. It is based upon his physiological studies of different organs, especially the heart and eye, and he employs his principles to construct a common framework valid in relation to both physiology and psychology. He states two hypotheses, and proceeds to abandon one and to adopt the other. The hypotheses are those of "cause and effect" and "balance"; the "gunstriker" concept of Gowers which requires an external effect to produce an internal cause, as in the familiar electrical stimulus of the muscle-nerve preparation in physiology, and the alternative hypothesis of synergic balance and internal rhythm within the structure of the neurone, which is modified but not caused by changes in external events.

The new doctrines are well and briefly summarised, and the hypothesis of balance is assumed. The two rhythmic synergic aspects of a neurone are described as kinesiphores A and B, the intensity of A being denoted by H and of B by L; so that if T denotes the maximum energy effort of mind, the relations between the three quantities are given by $H + L = T$. This concept is linked up with the Freudian viewpoint, reality being mediated by kinesiphore A and pleasure-pain by kinesiphore B. It is thus suggested that Freud's principles of super-ego and id are properly to be regarded not as antagonists but as synergists.

Having established his principle, Prof. Burridge proceeds to examine memory and dreams from the point of view of neurone-rhythm, developing the picture "of an organ of mind consisting of a vast complex of discrete groupings of neurones, each group dancing to its own rhythm with its own strength." His concept of shock, fits, and spasms seems to be particularly important both in its physiological and psychological bearings; but he is able to offer much illumination on all the problems of mental function and disorder, the whole of which he embraces within the scope of his theory.

The book is not easy to read, and at times the meaning is obscured by being overloaded. But Prof. Burridge deserves credit for having produced in so short a form a work of great value upon the obscure subject of vital energy. It should be read by every physiologist and psychologist who does not suffer from an immovable fixation within the synergic rhythm of his own ideas.

British Journal of Surgery

THE January issue (Vol. XXI., No. 83) includes the following papers: Carcinoma of the Kidney, by Graham Simpson (Sheffield). The diagnosis of carcinoma of the kidney is considered, as distinct from Grawitz's tumour, and malignant tumour of the kidney pelvis. Hæmaturia, intense backache, and absence of enlargement of either kidney justify the diagnosis; X ray examination shows collapse of a lumbar vertebral body (usually L 1–3).—Right Paraduodenal Hernia, by A. C. Halliwell (Jersey). A case in which almost the whole of the small intestine was found at operation to be retroperitoneal. Circular constriction, as if by the neck of a hernial sac, had produced chronic obstruction.—Two Cases of Ossification of the Internal Semilunar Cartilage, by H. Jackson Burrows (London). Both followed football injuries. Histologically the appearances suggest a sequence of hyperplasia of the fibrocartilage, deposition of calcium, with eventual revascularisation and ossification.—The Fallacy of Expectant Treatment in Appendicitis, by H. C. W. Nuttall (Liverpool). An account of 551 consecutive cases treated by immediate operation, with a mortality of 2·5 per cent.—The Pathology, Diagnosis, and Treatment of Congenital Diaphragmatic Hernia in Infants, by N. R. Barrett and C. E. W. Wheaton (London). Two cases are reported. The abdominal route is strongly advocated for operation.—Prostatectomy with Closure: Five Years' Experience, by S. Harry Harris (Sydney). A description of the author's operation: suprapubic prostatectomy, plastic reconstruction of the prostatic urethra, and closure of the abdominal wound. In 371 cases there have been ten deaths.—Enlargement of the Anterior Portion of the Prostate Gland, by B. S. Cran (Aberdeen). The histological appearances were identical with those of median or lateral lobe enlargement.—An Inquiry into the Results of Surgical Treatment of Genital Tuberculosis in the Male, by R. O. Lee and K. Bowes (London). Eighty-nine cases have been followed to determine the late mortality and the recurrence-rate after limited and more radical forms of operative treatment. Vesiculectomy slightly improved the remote mortality, but did not influence recurrence in the other epididymis.—Calcification, Decalcification, and Ossification, by R. Watson Jones and R. E. Roberts (Liverpool). An exhaustive survey of the pathological factors involved in these processes, with clinical applications.—A Case of Hyperparathyroidism with Certain Unusual Features, by T. W. Mimpriss and R. W. Butler (London). The disease occurred before the fusion of the epiphyses, and was associated with marked changes at the epiphyseal lines.—The Occurrence of Scrotal Hernia in Mice under Treatment with Œstrin, by Harold Burrows.—Benign Giant-cell Tumour of Third Cervical Vertebra: A Case Report, by J. A. MacFarlane and E. A. Linell (Toronto). Pathological fracture first produced symptoms. Progress under treatment by splinting and X rays was good. Death followed a violent accident.—Adenopapilloma of the Stomach with Lymphoid Hyperplasia of the Duodenum, by A. E. Webb-Johnson and E. G. Muir (London). The case was diagnosed before operation on the radiological evidence. Partial gastrectomy was completely successful.—Spontaneous Dislocation of the Hip in Childhood, by P. N. Ray (Calcutta). Developed during convalescence from bacillary dysentery.—Two Cases of Keloid Formation, with Comments, by C. E. L. Burman (Pietermaritzburg). The author believes that the tendency to keloid formation and to the growth of cancer are mutually exclusive. It is suggested that the development of the adrenal medulla at puberty may be associated with an overgrowth of the cells of the stratum granulosum.—Acute Infective Osteomyelitis of the Tibia: Use of the Winnett Orr Technique, by M. G. O'Malley (Galway). An account of 17 cases, all severe, with one death treated by extensive exposure, complete saucerisation, and plaster casts. The results were excellent.

A number of rare cases are also reported.

TESTIMONIAL TO DR. MEARNS FRASER.—Representative citizens have put their names to an appeal in the local press for a testimonial to Dr. A. Mearns Fraser, who is shortly retiring from the medical officership of health for Portsmouth after 37 years' service in the borough. Subscriptions may be sent to the secretary and treasurer of the fund, Mr. Ernest Edmonds, 70, Commercial-road, Portsmouth.

THE LANCET

LONDON: SATURDAY, FEBRUARY 3, 1934

THE PREVENTION OF DENTAL CARIES

THE appearance of the third report[1] on the investigation into the structure of the teeth in relation to dental caries, carried out by Mrs. MAY MELLANBY over the last 17 years, completes a trilogy of which the author has every reason to be proud. The three reports embody a mass of work scarcely to be paralleled in dental science, scientifically planned, skilfully controlled, cogently argued, and carefully documented. In this final volume Mrs. MELLANBY marshals the evidence supplied by experiments on animals, by the examination of a large number of teeth, and by a series of experiments on children with adequate controls. Starting off with the thesis, which has been conclusively proved by work on animals, that calcification is controlled by vitamin D, she went on to satisfy herself that human teeth, in this country at any rate, show evidence of defective structure (judged by the standard provided by animal feeding experiments) which it seems logical to associate with vitamin deficiency. The next stage was the demonstration by means of correlation of structure with the incidence of caries that there is a definite association between perfect structure and freedom from dental caries. From this point she proceeded logically and naturally to a series of feeding experiments on children living under more or less fixed conditions and given a diet specially rich in vitamin D, while a parallel group without extra vitamins served as controls. The results of these feeding experiments, it is claimed, provide conclusive proof of the theories suggested by animal experiments and by a combined statistical, clinical, and microscopical study of teeth in situ or extracted. Finally, in the light of these various investigations, Mrs. MELLANBY states the general principles of feeding which might be expected to result in a substantial reduction of dental disease among civilised races.

It would of course be possible to pick holes in this or that argument or to point out that some of the findings might well be explained in other ways and do not necessarily exclude other hypotheses. But there is little doubt that for many years the attention of the dental profession has been focused too closely on the environment of the teeth and too little on the teeth themselves. The fact that Mrs. MELLANBY has approached the subject not from the clinical standpoint but primarily as a biologist interested in structure and growth, has given a fresh orientation to the study of dental caries which has been of the utmost value. It is now generally admitted that the structure of the teeth both in animals and in man depends largely on an adequate supply of vitamin D, nor is her contention that the more perfect the structure the greater the resistance to dental caries now disputed. These premises being accepted, the natural conclusion is that an adequate supply of a diet of high calcifying value during the formative period of the teeth would go far to abolish the incidence of caries, and this is the main lesson of her work. A side issue of immense practical importance in this country where cereals are cheap and form a large proportion of the diet of children is that cereals contain some substance inimical to calcification. Fresh evidence of this inconvenient fact has emerged as a result of the fourth investigation on children, at Sheffield, in which the effects of a cereal-free diet were tested. The elaborate grading of human teeth by macroscopical and microscopical tests into various degrees of hypoplasia has resulted in the acceptance of a standard of normality which is perhaps too strict; it might be argued that too little latitude is given to the existence of variations within the range of the normal. The demonstration that the teeth in a community with a natural immunity to caries have a higher standard of structure than those found in the English race would provide further confirmation of Mrs. MELLANBY'S thesis, and it may be hoped that such an investigation will be made. But it is clear that a large proportion of both the deciduous and permanent teeth of the people in this country show a structure less perfect than may normally be found in animals, and the effort to achieve a better standard of structure by improving diet during pregnancy and childhood is certainly worth making. The controlled feeding experiments described in this report all go to show that in the presence of a plentiful supply of vitamin D the liability to fresh caries was distinctly lessened. Mrs. MELLANBY suggests the following dietary principles: "The consumption of milk, eggs, cheese, animal and fish fats, and vegetables must be greatly increased, and the consumption of cereals correspondingly diminished, and, for the very young, abolished. Breast-feeding must be general and prolonged even up to a year or more, provided a supplementary diet is given after about six months, which should include some iron and vitamin C. Cod-liver oil or some other source of fat-soluble vitamins should be given to all infants and children."

While we acknowledge the value of this contribution to preventive medicine, we would deprecate any tendency to decry attempts to promote and maintain oral hygiene, at any rate until it is definitely proved that the dietetic environment is a negligible factor in dental caries. Is it quite immaterial whether the diet be sticky or detergent, rich or poor in fermentable carbohydrates, provided that the teeth are well calcified, and that the diet provides for the laying down of secondary

[1] Diet and the Teeth: An Experimental Study. Part III. The Effect of Diet on Dental Structure and Disease in Man. By May Mellanby. Medical Research Council, Special Report Series No. 191. H.M. Stationery Office. 1934. Pp. 180. 5s.
Parts I. and II. of this study appeared as Nos. 140 (1929) and 153 (1930) of the Special Report Series.

dentine? It would be premature to assume that, provided sufficient vitamin D is taken, the physical characters of the food do not matter; that sweets can be sucked with impunity and biscuits eaten before bedtime; that food which requires vigorous mastication has no merit over that which is soft and sticky; and that the toilet of the mouth has æsthetic rather than hygienic value. Surely there is room for both methods of trying to combat dental disease.

PSYCHOLOGY OF QUACKERY

So familiar and near an evil as quackery naturally receives attention in medical journals, but, although there are many historical and social studies, the psychological factors in its maintenance are seldom examined. This is a pity if quackery is to be attacked successfully. Demonstrations of how worthless and unscientific such treatment may be are of no force when offered to people who do not judge on scientific grounds—and the public which comes to be cozened is not made up of rational critics. Moral fervour against the quack serves far less purpose than inquiry into the minds of his supporters. There are many kinds of quacks, each with an attendant trusting band; it is not reasonable to suppose that all the quacks are conscious charlatans and that all their customers are dupes. Some quacks are doubtless honest; some patients of quacks may be benefited. But the age-old prosperity of the quack rests on firmer ground than his occasional sincerity or therapeutic success. The modes of thought which lead people of every class of society and of every kind of education to seek the charlatan's guidance are of permanent importance, while his knowledge and arts change with each decade. What the charlatan preaches or does is often the stale medicine of an earlier century, laced with magic; what he appeals to is the same now as in the days of Tabarin or Trotula.

In the address from the chair to the medical section of the British Psychological Society Dr. JOHN RICKMAN has done a service in inquiring into this matter. He was able to point to analogies in the behaviour of races with a very different culture from ours. The shaman, for example, who holds so important a position in the north and east of Asia, has considerable medical functions, and it is possible that the attitude of those who use him to relieve them of their demons is closely related in its essentials to that of many who in our civilisation furnish the wherewithal for quacks to grow fat. The development of priesthood, sometimes even coexisting with shamanism in the same society, furnishes further material of comparison; method and training, and, later, rational thinking have been the criteria by which it became possible to distinguish the quack from the scientific healer, as the shaman could be distinguished from the priest or from the observer who relied on what had been discovered rather than on intuition or magic. It would be going too far to say that the stages represented by shaman, priest, and scientifically trained observer are those through which European medicine has passed, or that they correspond to the different attitudes we may see around us to-day; neither can we assert that psycho-analytical interpretation of the phenomena of quackery, such as Dr. RICKMAN suggested, is adequate to explain the perennial mountebank and his train of gulls and admirers. But informed speculation about this obscure matter is desirable until more immediate data have been collected by close examination of the minds of quacks and clients.

There is another aspect to the problem, lately stressed by Prof. H. BURGER, of Amsterdam, in his address at the Royal Society of Medicine.[1] The successes of the quack are sometimes undeniable, but they are relatively few, and they are not relevant to the issue between him and the trained worker; the test of rational therapy lies more in the certainty than the number of its triumphs. The quack works by intuition rather than rule, and his expectation is sanguine; consequently he is efficacious sometimes, harmful often, confident always, justly certain never. Which patients will have the psychogenic disorders or mental attitudes which make them sure to respond to such artifices as his he cannot foretell. A careful study of the people who are benefited by the quack would throw light not only on their attitude towards disease and healing but also on the criteria of efficacy for certain forms of psychotherapy. No matter what the particular nostrums employed, the methods of the quack make use of tendencies in the sick which are familiar to the psychiatrist, though doctors do not always avail themselves of them as they might. They should not be ignored. A little honest propaganda about such matters might be well advised. When the public grasps what kind of disorders can be benefited by psychotherapy—whether orthodox or casual and blind—and sees that these ends can better be achieved by rational than by haphazard methods, there will be less of facile wonder at the quack's occasional successes, though it would perhaps be utopian to expect his practice to dwindle correspondingly. Those other forces which were discussed at the British Psychological Society are too old and obstinate to be ousted lightly. Before they can be ousted, they must be studied and understood.

DIPHTHERIA IMMUNITY AMONG ISOLATED RACES

THE problem of racial immunity to infective diseases has always been one of great interest to medical biologists and although much material has now accumulated it can yet hardly be said that we are in a position to have any clear views on the subject, particularly in the case of those diseases in which environmental conditions or the habits of the people fail to provide an explanation of the distribution of the disease. There is probably no infectious disease about which we know so much, and from so many sides, as diphtheria. The means of isolating and identifying the bacillus are almost perfect and the methods

[1] THE LANCET, 1933, ii., 1148.

of judging immunity in the individual or the herd are also technically more perfect than in any other infectious disease. The study of the geographical and racial distribution of diphtheria ought therefore to prove of value in settling some of the problems of racial immunity. But surveys of diphtherial infection and immunity in remote parts of the world have not been satisfactory. This is not to be wondered at, considering the difficulties of individual travellers in carrying out investigations which would call for the resources of a properly equipped scientific expedition. We have the more reason to be grateful for two recent studies dealing with diphtheria in widely separated and remote parts of the world. J. R. WELLS[1] records his observations among the central and polar Esquimaux; E. GRASSET[2] and his colleagues deal with the Bantus of Portuguese East Africa. Among both these races diphtheria is practically unknown as a disease, yet Schick-test surveys among the natives (confirmed by antitoxin titration of their blood) have shown that both peoples have a specific serum immunity to diphtheria toxin. Among the Esquimaux this immunity is neither so high nor so extensive as among Europeans, but among the Bantus it is higher. Must we conclude that the specific immunity thus indicated is a physiological gift of these peoples or are we to accept the more conventional view that somehow or other they have been exposed to the specific stimulus of infection with virulent diphtheria bacilli?

Only an extensive bacteriological survey among the populations studied can settle this point with any certainty. WELLS has made such an attempt among the Esquimaux; it is unlikely that bacteriologists will be fully convinced by his demonstration that virulent diphtheria bacilli were present among the population. In GRASSET'S study no bacteriological survey appears to have been carried out, but a considerable amount of evidence is produced to suggest that there is no immunological mystery about the high Schick-negative rate among the Bantus. The distribution of antitoxic immunity in terms of age-groups is closely similar to that in Europeans and the higher Schick-negative rate in Bantus may be ascribed to the crowded conditions of village life among these tribes. Neither of these studies can then be taken as giving any support to the *Reifung* theory of Hirszfeld, viz., that specific antitoxin can arise by unspecific means. It may be said that very little in the way of direct evidence has ever been adduced in direct confirmation of this theory, but it has at least been valuable in keeping in front of immunologists the serious gaps in the defences of the specific or—as the Germans call it—the *Durchseuchung* theory. Nothing but really adequate bacteriological surveys will clear up the situation; the present work, as well as previous work by ASBELEW and MARGO[3] among the Samoyedes and that of KLEINE and KRÓ[4] and FISCHER[5] among African tribes, can hardly be said to do more than provide preliminary data. We may look near home and find an analogous hiatus in knowledge which a little industry might easily fill. It is well known that many horses, particularly older horses and horses which have come from crowded stables, have specific diphtheria antitoxin in their sera. Attempts to show that virulent bacilli occur in the nose and throat of horses, or among their human attendants, have been almost always disappointing. One or two cases of diphtherial infection among horses have been described,[6] but such isolated instances cannot be quoted as an adequate explanation for the widespread antitoxic immunity which is found.[7] OKELL and PARISH found virulent diphtheria bacilli in the trivial skin-wounds and galls of 3 out of 13 horses in a remount hospital, and in one the presence of the bacillus was accompanied by a rising titre in the circulating antitoxin of the animal.

Such findings as these may be taken as provisional support to the specific origin of the natural antitoxin of horses, but similar observations might be extended so as to provide a more comprehensive solution of the problem. Such an investigation would provide a good subject for someone who has access to the right kind of material, e.g., a bacteriological officer of the Royal Army Medical or Veterinary Corps. If we have to admit that horses owe their antitoxin to infection with virulent diphtheria bacilli we are presented with a reservoir of infection of some magnitude, and one of which we ought to know more.

[1] Amer. Jour. Hyg., 1933, xviii., 629 and 656.
[2] South African Med. Jour., 1933, vii., 779.
[3] Zentralb. f. Bakt., 1932, cxxvi., 212.
[4] Deut. med. Woch., 1930, lvi., 46.
[5] Zeits. f. Immunitätsf. u. exper. Therap., 1932, lxxiv., 244.
[6] Cobbett: Zentralb. f. Bakt., 1900, xxviii., 631; Minett: Jour. Comp. Path. and Therap., 1920, xxxiii., 267.
[7] Brit. Jour. Exper. Path., 1926, vii., 173.

THE DISPLAY OF CONTRACEPTIVES

THAT knowledge of adequate contraceptive methods should be in the possession of women whose health is likely to suffer from pregnancy is now fairly generally conceded. The general principle was acknowledged years ago by the Ministry of Health in a memorandum (MCW.153, July, 1930) and in a circular (No. 1208) addressed to local authorities explaining the conditions under which they may, at their discretion, establish facilities for advice on contraception to be given to expectant and nursing mothers and to women suffering from what are broadly called "gynæcological conditions." Many people would like to see the conditions widened under which such advice could be given. They would like them to include the requirements of the healthy woman who wishes to space the births of her children within intervals compatible with her physical and financial resources. The fact that, in the Government's view, economic circumstances do not provide a justification for a local authority to make the above-mentioned provision has contributed to the growth of private birth-control clinics at which advice on contraception is given to every married woman who asks for it. But while supporting the terms of the Ministry's memorandum and circular, and also endorsing the activities of private birth-control clinics, the critical observer of the birth-control movement is by no means called upon to approve

of all the circumstances in which contraceptive appliances may be sold, displayed, and advertised. Contraceptives may at present be hawked or offered for sale (otherwise than in shops) in the streets, or may be obtained from automatic machines. Purveyors of contraceptives may, without invitation, enter a person's premises and offer these articles for sale. Manufacturers of contraceptives may send to anyone they like, irrespective of their age, advertisements of their products. By people whose engagements are announced in the papers circulars are often received containing price-lists of rubber goods accompanied with excerpts from the proceedings of a recent ecclesiastical conference and from speeches by well-known medical authorities and peers. And all urban dwellers are familiar with the window displays of shops in which may be seen massed arrays of spermicidal suppositories, penile sheaths, semi-pornographic books, trusses, suspensory bandages, pessaries, and vaginal syringes.

We print elsewhere the text of a Bill introduced by Lord DAWSON in the House of Lords just before Christmas, the object of which is to restrict the sale, display, and advertisement of contraceptives in such a way as to make impossible the occurrences described above. This Bill, it should be noted, does not attempt to suppress the sale of contraceptives; it seeks to regulate their sale in such a way that they will fall into appropriate hands. That widespread promiscuity depending on the use of contraceptives is financially profitable to the manufacturers of these products can scarcely be denied, and the translation of this measure into law should bring about a valuable measure of restriction in the publicity with which the distribution takes place. An undoubted encouragement to laxity is afforded by the obtrusive manner in which preventives are introduced to public notice, and Lord DAWSON'S Bill takes this into account, without interfering with contraception undertaken upon medical or economic grounds.

ANNOTATIONS

CHILD GUIDANCE REVIEWED

FIVE years ago the Jewish Health Organisation of Great Britain, apprehensive of the growth of nervous disorders among the children in East London, founded a child guidance clinic, the first of its kind in this country. Dr. Emanuel Miller, hon. director of the clinic, has just reported on its work from 1927 to 1932, and his analysis of 200 consecutive cases shows that nearly half improved, and improved sufficiently to end treatment. This may not seem a striking figure at first glance, but it indicates that of every two children coming to the clinic one became a competent citizen instead of a drag upon his fellows. Children were referred to the clinic for various reasons; the treatment of delinquent children of course forms part of the work, but only a part, and psychoneurotic and behaviour problems such as enuresis, stammering, temper storms, night terrors, backwardness, either general or in one school subject, and truancy are among the conditions commonly treated.

The staff of the clinic consists of a basic limit of three—a physician, a psychologist, and a social worker; their first task is to collect data about the case, but the information so obtained is a point of departure in the treatment of the child, and not an end in itself. A detailed study of the home conditions is not essential in every case, but when it is deemed necessary the social worker visits the home and forms an opinion of the influences at work there. Lack of harmony in the family is a frequent finding, and overcrowding often aggravates this. Unfortunately the difficulties of rehousing families are great, and this must be borne in mind in assessing the work of the clinic. Children can sometimes be boarded out for some months while the social worker does what she can to improve home conditions. The clinic is in touch with the London County Council housing department; of 34 families notably badly housed it has been possible to house 16 more satisfactorily while two have obtained more room. For various reasons the remainder are not yet comfortably settled.

Clinics of this kind provide an opportunity for research into the relation of social conditions and mental reactions. From a table showing the symptoms found in children from unstable and broken homes it appears that behaviour disorders are more prevalent than psychoneuroses, but the sample is too small to draw definite conclusions. A table showing the position in the family of the patients indicates that in small families the elder children, especially the first, and in large families those at the tail end, are most prone to psychological maladjustments, a finding in agreement with those of Mr. Meyer Fortes, Ph.D., in his study of the influence of position in sibship on juvenile delinquency. In order to investigate the value of therapy in the social and psychological adjustment of patients a sample of 50 cases discharged from the clinic before March, 1931, were followed up, with the following result: of 16 girls over fourteen, 9 are satisfactorily placed at work, 3 are working irregularly, 2 are unemployable, 1 an invalid, and 1 in an institution for mental defectives; of 7 boys in the same age-group, 4 are in regular work, 2 in approved schools, and 1 in an institute for mental defectives; of 27 children under fourteen years of age, 14 are reported as satisfactory, 6 as not satisfactory, 4 as uncertain, and 3 as mentally deficient. It will be seen from these figures that mental defect does not play a large part in the production of maladjustment, and indeed the average intelligence quotient of children attending the clinic is 97, so that they are a fair sample of children of average intellectual ability; it is all the more important, therefore, that they should learn to fit comfortably into the social pattern, and experience shows that the clinic is often able to help them to make the adjustment.

IRON ABSORPTION IN ANÆMIA

STRUCK by the apparent relationship between feeble gastric secretion and faulty formation of the blood, S. R. Mettier and G. R. Minot in 1931 tried to determine the significance of achlorhydria in the causation of idiopathic hypochromic anæmia. They were able to show that in this condition iron is more readily absorbed from an acid than from an alkaline medium. Working with Rinehart and Kellogg,[1] Mettier has now made a further contribution to the subject. They compared the response of patients to large

[1] Mettier, S. R., Kellogg, F., and Rinehart, J. F.: Amer. Jour. Med. Sci., 1933, clxxxvi., 694.

doses of iron and ammonium citrate with their response to an "iron-rich" diet containing 16–20 mg. of organic iron daily (10–12 mg. is considered more than enough to meet ordinary metabolic needs). It was found that patients who showed no improvement in hæmoglobin and hæmopoiesis on the iron-rich diet reacted well to 6 g. of iron and ammonium citrate daily. Then they compared the response to a diet rich in iron with the response to a diet previously digested in vitro with hydrochloric acid and pepsin. The meal consisted of two boiled eggs, 200 g. of cooked spinach, and 300 g. of lean beef protein freed of fibrous tissue. This was found on analysis to contain 12·5 mg. of iron. The response to such therapy compared favourably with that obtained with iron alone. The investigators conclude therefore that "chronic idiopathic hypochromic anæmia is one presumably due to a deficiency of iron wherein gastric dysfunction leads to failure in utilisation of organic (dietary) iron." These observations confirm a single experiment by W. Dameshek,[2] who obtained a definite reticulocytosis on giving a predigested diet of eggs and spinach to a patient with the same type of anæmia. M. M. Wintrobe and R. T. Beebe, on the other hand, failed to get any response to Hamburg steak predigested with normal gastric juice.

COMPARATIVE STUDY OF BRIGHT'S DISEASE

At the section of comparative medicine of the Royal Society of Medicine on Jan. 24th Dr. Dorothy Russell reviewed the principal histological changes in chronic Bright's disease in man, laying special emphasis on the necessity for separating the ischæmic form of nephritis, due to progressive arterial degeneration, from the distinctive inflammatory changes of Bright's disease. Dr. T. Hare gave the results of his work on chronic nephritis in the dog. Although the equivalent of acute and subacute nephritis in man is seldom seen in this animal, and is then usually associated with some obvious infective focus such as endocarditis, there is no doubt that a chronic progressive nephritis corresponding to chronic interstitial nephritis or nephritis repens in man is relatively common. The disease is manifested in middle age as a rapidly fatal illness of a uræmic character, associated with the secretion of a urine of low specific gravity containing albumin, hyaline, and granular casts. Dr. Hare also described a syndrome of the greatest interest, in which the condition known as "rubber jaw" or osteoporosis of the skull was found by him to be associated in 11 dogs with chronic nephritis, along with foci of metastatic calcification in various organs and hyperplasia of the parathyroid glands. Other bones seem to be rarely affected, but a similar change, which he described as being histologically identical with osteitis fibrosa, was occasionally seen in the ribs and, more rarely, in the femur. Dr. Hare considers the nephritis to be the primary lesion in this syndrome, and his view is certainly supported by rare cases in man in which chronic nephritis has been complicated by hypercalcæmia and metastatic calcification. Prof. J. Duguid described the production in rats of a chronic nephritis by overdosage with vitamin D, combined with a diet rich in acid sodium phosphate. The damage appears to affect first the tubules and later the glomeruli, which undergo atrophy. The final change is an arterial hypertrophy; this is of particular interest, in view of the difficulty of producing cardiovascular hypertrophy by experimental means. Chronic nephritis can also be produced in the rat by feeding them with a diet from which magnesium has been excluded. Experiments in illustration of this were described by Dr. W. Cramer. The nephritis differs from the nephritis produced by Duguid in that the glomeruli here are affected first, the tubules later, and the arterioles not at all. This experimental work, though of great intrinsic interest, does not seem to offer any solution of the ætiological problems in spontaneous chronic nephritis. Prof. J. G. Wright emphasised the difficulty of discovering any factor of ætiological significance in the anatomical investigation of chronic nephritis in the dog. The problem is, however, one of the utmost importance from the human point of view. The spontaneous occurrence in the dog of a nephritis, which appears to be histologically identical with the insidious nephritis repens in man, opens up a field for research which should not be neglected. The discussion illustrates the value of close coöperation between human and veterinary pathologists. In pursuing their work the latter frequently have recourse to publications dealing with different aspects of human pathology; this applies, on their own admission, to the study of Bright's disease.

[2] Jour. Amer. Med. Assoc., 1933, c., 540.

THE GRAEFENBERG MEDICAL INSTITUTE

In the last bi-monthly issue of the *Annals o Medical History* Dr. Roy Turner writes an interesting note upon the Graefenberg Institute, which played a serio-comic rôle at Dadeville, Alabama, from 1846 to 1873. This Institute had a remarkable history, in that it was a family affair, started in a rural community which only a few years before had been the hunting ground of Indians; it developed, while retaining its family characteristics, into a degree-granting medical organisation. The founder, Philip Madison Shepard, was the child of a poor farmer and found himself, at his father's death, only 13 years of age and the head of his family, with a debt upon the farm and his mother, brother, and four sisters to support. His mother married again after an interval and he was relieved of most of the family responsibilities, but six years had been spent in back-breaking toil with only a few opportunities for self-education. He was drawn towards medicine, and was on the point of beginning practice "on his own responsibility," which would seem to be Dr. Turner's way of suggesting that he was meditating becoming an unqualified healer, when he obtained, somehow, sufficient money to enable him to enter a recently founded medical school in Augusta, a town 125 miles away from his home. He walked there and graduated after a curriculum of two years' duration. He married at once and went into practice at Lafayette, Alabama, and held classes of preparation for young men who wished to become doctors. He was prosperous in his profession and his educational idea caught on, and in the year 1852, having migrated to Dadeville, he was able to advertise that he had under his supervision a medical school ready for students, which had received a charter from the State legislature; the graduates, he promised, would be entitled to all the privileges accorded to those of leading medical schools. Shepard seems to have had governmental right to say this, though the medical curriculum might be only of four months' duration. Practically the teaching was in the founder's own hands, while other members of the staff were relatives to whom he granted diplomas. The students boarded with the family and lived in an annexe to the main house. In 1860 the founder occupied three professorial chairs in the Graefenberg Medical Institute and shared the responsibilities of two others with the

youngest of four sons. The eldest son held two professorships and the third son, who graduated at the Institute at the age of 17, became professor of obstetrics and diseases of women and children. Dr. Turner reports that this precocious gentleman is said to have officiated at childbirths at the age of 15. One son appears not to have been a disciple, but the only surviving daughter received a medical training, though public opinion was against her practising on the grounds of sex. Another daughter, who died at the age of 14, was studying medicine. The archives of the Institute display in its founder a singular mixture of medical enthusiasm, religious fervour, and astutely planned self-advertisement. The school came to a virtual end with the death of the founder at the outbreak of the American Civil War, though the actual closing did not take place till 1873.

SECRECY AND VENEREAL DISEASE

THE regulations governing the treatment of venereal disease in this country are framed to ensure a system so discreet that not only is the patient safeguarded by anonymity, but it is practically impossible to trace the origin of any case at a public clinic. There is, however, one circumstance in which the secrecy is not maintained, as Dr. L. F. Beccle showed in a communication to the Medico-Legal Society on Jan. 25th. The protection under the regulations is overridden when the necessities of a lawsuit demand that a medical man shall divulge information that he has learnt in professional confidence. The leading case on this conflict is *Garner* v. *Garner* (1920), in which a married woman petitioned for divorce on the grounds of adultery and cruelty, the cruelty being her alleged infection with syphilis. She called one of the medical officers of a London hospital to give evidence of her disease, and he pleaded his obligation of secrecy under the national scheme. Mr. Justice McCardie, however, made it quite clear that the medical man's duty to assist justice by giving evidence was paramount. It does not seem to have been suggested even by the most ardent advocate of medical "privilege" that a doctor who divulges a secret in obedience to the order of a judge does anything less than his duty as a medical man. Another dilemma, mentioned by more than one of the speakers who followed Dr. Beccle, is perhaps more difficult—that is, where a doctor examines a member of a household and finds him infected with venereal disease and, despite a warning, that member declines to adopt precautions to safeguard the other members of the household from infection. Should the doctor give such information as is necessary to ensure their safety? One medical speaker claimed to have treated a large number of cases and never to have known one in which venereal infection was contracted innocently, but others, including Sir Bernard Spilsbury, who presided, assured him that these diseases like other infections could be conveyed by contact and sometimes in other ways. Sir Bernard expressed a decided opinion that in such a case it was the medical man's right and probably his duty to take steps to protect innocent persons from danger. To say to a third party that a certain person has venereal disease is an actionable slander and no special damage need be proved, but when the statement is made in good faith with the sole object of protecting the health of persons who might be in danger, a court of law would almost certainly hold it privileged. The risk of a patient's confidence being disclosed in legal proceedings is very slight and ought not to weigh to any great extent with sufferers from venereal disease in their desire to obtain treatment under conditions of secrecy. Before such evidence is required in court the necessity for it has been carefully scrutinised by solicitors, counsel, and judge, so that unless it is indispensable it is not called. Sir Bernard gave an interesting sidelight on the statutory arrangements in their ordinary operation. A susceptible patient, he said, may react very unfavourably to the administration of the organic arsenic compounds used for the treatment of syphilis. He had sometimes found on post-mortem examination considerable quantities of arsenic in the organs for which no evidence had accounted, and it had been impossible to ascertain what treatment if any the patient had been receiving, since the signs of venereal disease had disappeared. In many of these cases the arsenic might have come from the compounds injected at a venereal disease clinic, but it might also have been criminally administered, and the secrecy observed about the treatment might conceivably afford a temptation to a poisoner. He offered the suggestion, for what it was worth, to members of the Bar present who might have occasion to defend clients on the charge of the felonious use of arsenic.

THE SEX HORMONES

SINCE 1929 Dr. C. F. Fluhman has contributed to the *American Journal of Obstetrics and Gynecology* three reviews of published work on the relationship of the anterior hypophysis and the ovaries. The latest of them (1933, vi., 768) brings his survey to the end of last June, and we hope it will be followed by others. Primarily the reviews are intended to catalogue results, and no attempt is made at critical discussion—a wise decision in view of the present magnitude of such a task. Fluhman's service is chiefly that he has classified his material in a logical manner—which was by no means easy—and has thus made it possible for the reader to get a good idea of the directions in which the work is proceeding.

A SUBSIDISED ATLAS OF PATHOLOGY

THE Atlas of Selected Cases of Pathological Anatomy,[1] dedicated to the tricentenary of Amsterdam University, is a striking production in many ways. The atlas is a handsome volume in folio of 73 pages, each containing a plate: most of these are in colour, after original drawings by two competent artists who have carried out the work during many years under the direct personal supervision of W. M. de Vries, professor of pathology in the university. The selection of the cases to be illustrated reflects his critical interest; the subjects have been chosen not with the intention of compiling a more or less complete atlas of pathological anatomy, but some because they were needed for a publication, others because the pathological state depicted was very rare or characteristic, and others again because he had failed to find a good drawing of the condition in the available literature. The admirable summaries, in English, of the pathology, clinical history, and post-mortem findings which describe the plates are models of clarity. All are of the highest standard, but it is permissible to draw attention to the examples of combined tubercle and cancer for their pathological significance and to the plates of lung in Spanish influenza and of melanoblastosis of the pia mater of the spinal cord for the beauty of the reproductions. The circumstances which made possible the preparation and publication of this atlas convey a message

[1] Atlas of Selected Cases of Pathological Anatomy. By W. M. de Vries, professor of pathological anatomy at the University of Amsterdam. Amsterdam: J. H. de Bussy, Ltd. 1933. Pp. 73. 25 Dutch guilders.

worthy of note and imitation. The municipality of Amsterdam started the activity of which we now enjoy the results by making a subvention in 1914 to the laboratory of pathological anatomy for the execution of drawings of pathological specimens; and the Jan Dekkerstichting and the Amsterdamsche Universiteits-Vereeniging have now financed the publication of these examples of the work in this form. The lesson to be drawn is that the establishment of even a modest fund devoted to a similar purpose in connexion with the pathological departments of our great medical schools would keep the memory of the founder in grateful remembrance. We have in the reprints and publications of the Sydenham Society a fine example in another field of what such a subsidy can achieve. Such a fund applied to pathology would help to carry on the tradition of careful and beautiful work in this fundamental medical science—a tradition that is in danger of extinction.

DIVINYL ETHER

A TELLING plea for reliable pharmacological and clinical data in connexion with new drugs is put forward by C. D. Leake,[1] who points to the inadequate foundations of claims made for many of them, especially anæsthetics. Developing his theme he goes on to show how a consideration of the "biochemorphic" aspects of general anæsthetics led to the prediction that a compound incorporating the structural characteristics of ether and ethylene would be a general anæsthetic, and further that this unsaturated ether, divinyl oxide, would be better than any unsaturated ether with a greater number of carbon atoms in the side chains. When this prediction was made divinyl oxide, although theoretically known to chemists, did not exist. It has now been produced pure and in quantity sufficient for trial both largely in the laboratory and to some extent clinically. Divinyl ether is a clear colourless liquid, as explosive and inflammable as ordinary ether and more volatile. Its smell, however, is not so pungent as that of ethyl ether, and it is not so irritating, and its trial on over 400 patients has been highly satisfactory.[2] They were of all ages, from infancy to advanced old age, and every kind of operation came into the list. The anæsthetic was given by an open method, about 2 c.cm. per minute being needed. Induction of unconsciousness seems to be a good deal quicker than by ethyl ether and struggling proportionately less common. Relaxation and recovery left little to be desired.

THE SKIN-GRAFT LAPAROTOMY INCISION

Roberts and Johnson[3] describe a form of laparotomy incision which is little known in this country, although it has been in use for over 20 years. Its purpose is to provide two bevelled skin edges in apposition, in place of the usual square-cut edges. The result is said to be the healing of the skin with a minimum of scar tissue, so that the line of the incision is almost invisible. The wound is made in any of the usual sites on the abdominal wall, and, once the skin has been incised, the deeper tissues are divided according to ordinary practice. The skin incision is made with a knife held to the surface at an angle of about 30°, and this slanting incision is carried right down to the subcutaneous tissues. In closing the incision a continuous suture of No. 0 catgut is used to unite the superficial fascia. The needle is brought up at one angle of the wound, and a subcutaneous stitch is continued along the skin edge to the opposite angle, the needle being finally brought out of the wound about one inch from the end of the incision, and the suture secured there by a slip-knot. Strips of "isinglass plaster" are applied over the skin edges to hold them in exact approximation, and are fastened by the application of collodion. The wound is protected by a sterile towel until the patient has been returned to bed. It is then deliberately uncovered and exposed to the air to allow the serous exudate between the skin edges to clot and seal the wound. Excess of serum or blood between the plasters is absorbed by dabbing with a piece of gauze. The process of drying the wound takes about two hours. No dressing is applied.

In favour of this method it is argued that the patient is saved the unpleasantness of the removal of stitches, and is provided with a very fine white scar; the doctor (or hospital) is saved the expense involved in providing dressings, and at the same time frequent observation of the wound is made easier. Roberts and Johnson write of 487 cases in which it has been employed and say that no complications have arisen in any way prejudicing the patients' recovery; indeed, nearly 90 per cent. of the wounds have healed without the appearance of so much as a slight serous exudate or the formation of a small hæmatoma. There is no tendency for the skin-flap to slough, and infection does not seem to be common. In any wound, it is emphasised, protection from sepsis is provided not by the dressings but by the scab of dried serum closing the interval between the skin edges.

A REVERSAL EFFECT IN IMMUNITY

THE technique for the study of experimental epidemics developed by W. W. C. Topley and Major Greenwood in this country and by L. T. Webster in America has led not only to the formulation of new principles in epidemiology but has raised a number of new questions in individual immunity. An interesting finding arising from the study of mouse epidemics has recently been described by Topley.[1] It had been found previously that mice immunised against *B. aertrycke* were significantly more resistant to subsequent infection with a single dose of living bacilli than were normal non-immunised controls. This immunity proved, however, to be short-lived and incomplete, most of the immunised mice dying eventually from the infection. It thus appeared that the natural immunity of mice acquired by exposure to epidemics of aertrycke infection cannot be relied upon to prevent them from succumbing to the repeated contact infections to which they are exposed under herd conditions. An attempt to elucidate these observations has led to an unexpected, indeed paradoxical, result. A large number of mice were given weekly intraperitoneal injections of a killed suspension of a virulent strain of *B. aertrycke*. Each week 30 mice were withdrawn from the group and tested for resistance to a dose of living virulent aertrycke. The weekly injections were continued to the thirteenth week, samples being withdrawn for test every week until the fourth week, and thereafter at the end of 6, 8, 12, and 13 weeks. It was found that a single immunising dose produced some degree of resistance. Four to six immunising doses gave a maximum resistance, but eight doses had less effect than six and twelve less than eight. The twelve times vaccinated

[1] Jour. Amer. Med. Assoc., Jan. 6th, p. 1.
[2] Ibid., p. 21.
[3] Roberts, K., and Johnson, W. W.: Amer. Jour. Surg., December, 1933, p. 461.

[1] Brit. Jour. Exp. Path., 1933, xiv., 408.

mice were indeed little if at all more resistant than the once vaccinated, and the same held true for mice vaccinated thirteen times. Experiment showed that this lowering of resistance after multiple doses of vaccine was specific, there being no lowered resistance among aertrycke vaccinated mice to another infecting agent such as *Past. murisepticus*. Prof. Topley wisely refuses to generalise on these conclusions beyond the terms of the actual experiment, nor does he consider it possible to put forward any definite opinion as to the probable mechanism of this curious reversal effect. Among the explanations which he considers possible are that it may be due (1) to an accumulation in the tissues of active antigen; or (2) to an accumulation of some antigenically related but not identical substance such as a bacterial hapten; or (3) it might be the result of a secondary but still specific effect due to some unrelated constituent of the bacterial cell; or (4) it might result from a specific sensitisation of the tissues to one or other of these constituents.

INVESTIGATION BEFORE OPERATION

FOR thousands of years surgery was an affair of personal skill and prowess—of individual combat against disease. The need for skill remains as great as ever, but the surgeon of modern times works in his operating-theatre as the leader of a group. The object of this group is to make the operation safe for the patient; and as standards rise they perform it with increasing efficiency. Where progress still lags unnecessarily is the stage before this—the stage at which the patient should be made safe for the operation. If successful surgery now depends on team-work it is more and more obvious that the patient himself, or at any rate the potential forces of recovery in him, should be enlisted in the team. No one who reviews the bodily factors making for success or failure—as set out, for example, in Mr. E. R. Flint's Hunterian lecture [1] a year ago—can doubt that an immense amount may be done to ensure the safety of many patients by providing rest and recuperation, and by correcting the gross errors of metabolism which are apt to cause unexpected deaths. It is true, as Dr. F. J. Poynton said in opening the discussion at the Medical Society of London last week,[2] that the information obtained by a particular investigation may be dearly bought at a tax on the patient's strength. But it is also true, as he also said, that a period of preliminary observation with suitable tests gives comfort and confidence to the patient. As Mr. Norman Lake put it, the real surgical emergencies are few in number; and we believe the time is coming when the physician will take a stronger and more effective interest in the preliminaries of surgery. "The great hope of the surgeon to-day," declared Mr. W. E. Tanner in last year's presidential address to the Hunterian Society [3] "is that the physician will teach him better to appreciate his surgical risks and throw more light on some unrecognised causes of death after operation which have been too ignorantly ascribed to cardiac, respiratory, or renal failure, or to what is loosely called shock."

Pre-operative investigations, Mr. Lake pointed out, may have three objects: greater precision in diagnosis, an estimate of the operative risk, and an estimate of the prognosis after operation. Much of the discussion at the Medical Society was devoted to the first of these, and Dr. Edmund Spriggs gave an illuminating account of a relevant inquiry he made 14 years ago. In 500 consecutive cases, he said, the diagnosis reached after a preliminary clinical examination was compared with that made after further investigation. The diagnosis remained the same in 40 per cent.; it was modified in some material particular in 35 per cent.; and it was altered in 20 per cent—i.e., in one case in every five. No doubt the series included obscure and difficult problems, some of them complicated perhaps by previous operations. The point made by Dr. Spriggs, however, was that the new, and sometimes quite unexpected, diagnoses, although often indicated by laboratory and radiological tests, were not infrequently contributed to by the opportunity of a few days' clinical observation. Sometimes the new discoveries related to gross organic disease such as growths or ulcers, but in other cases widely differing states, such as amœbiasis, achlorhydria, tabes dorsalis, or diseases of the heart, lungs, and womb were unexpectedly found. Dr. Spriggs concluded that for want of such investigations hundreds of unnecessary operations are still done and hundreds of operations that ought to be done are left undone.

On the part of some of the speakers at the Medical Society there was perhaps a tendency to ask too much of the tests discussed. A surgeon may not always be able to decide by a film between duodenitis and ulcer, or by cholecystography to know whether a gall-bladder should be operated upon or not. These and other instances where a particular test or a faulty interpretation had proved misleading were given; indeed, they can be multiplied by all experienced clinicians. But the same may be said of laparotomy as an exploratory measure; for serious disorders of the stomach, duodenum, colon, glands, kidneys, and uterus may be unrecognised at an operation, and yet revealed by suitable investigation. Hard cases make bad law, and the value of the well-established radiological and laboratory methods of examining the alimentary canal, gall-bladder, kidneys, heart, lungs, and nervous system is beyond doubt. One would not take to a bow and arrow because an occasional cartridge misses fire.

THE Privy Council have nominated Sir Humphry Rolleston, Sir Malcolm Delevingne, and Prof. James Andrew Gunn additional members of the council of the Pharmaceutical Society in pursuance of the Pharmacy and Poisons Act, 1933.

AT a meeting of the senate of the University of London on Jan. 24th it was announced that the new British Post-graduate Medical School at Hammersmith is likely to be opened to students in October next.

Miss Nina Symington, daughter of the late Prof. Johnson Symington, F.R.S., has bequeathed the residue of her estate, amounting to some £9000, to the Anatomical Society of Great Britain and Ireland, for anatomical research. Prof. Symington, who died in 1924, for many years held the chair of anatomy at Queen's University, Belfast, and from 1903 to 1906 was president of the Anatomical Society.

INDEX TO "THE LANCET," VOL. II., 1933

THE Index and Title-page to Vol. II., 1933, which was completed with the issue of Dec. 30th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, London, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

[1] THE LANCET, 1933, i., 1163, 1223.
[2] Ibid., Jan. 27th, 1934, p. 188.
[3] Ibid., 1933, ii., 995.

THE PREVENTIVE ASPECTS OF MEDICINE

A Series of Lectures in progress during the Winter Session at King's College Hospital Medical School

XIII.—PREVENTION OF INFECTIOUS DISEASES

THE methods of prevention and control of infectious diseases readily fall into three groups: (1) isolation and quarantine; (2) the destruction or removal of the infecting agent by general measures of disinfection and sanitation; and (3) immunisation.

Isolation and Quarantine

METHODS OF INFECTION

I propose to consider the general problems from an angle differing slightly from that employed by Dr. Alison Glover in a previous lecture in this series. To a bacteriologist it is natural to keep an eye throughout on the infecting agent, bacillus, or virus. Fortunately we have considerable knowledge of the doings of traceable disease agents. The diphtheria bacillus is a characteristic organism, and by isolation on Löffler's medium or medium containing tellurite, characteristic staining, and by estimation of intradermic virulence for the guinea-pig neutralisable by specific antitoxin, we can identify it and trace its journeyings. It grows rapidly in the throat of an infected patient; it is coughed out by him; it may be spread by his fingers infected with his throat mucus. It is present in the throats of approximately 3 per cent. of apparently healthy people in the general population of London. In a modern city it is almost ubiquitous, and in a crowded child population we may find its trail in a Schick-negative rate as high as 80 per cent. Moreover, it may be present in the throat of a person in perfect health for at least two days before obvious infection has occurred.

We once had the fortune, in the course of routine swabbing and Schick-testing of the nurses in the South-Western Hospital, to discover a sister who was Schick-positive and had true virulent diphtheria bacilli in her throat. As soon as the tests were complete we telephoned to Dr. Foord Caiger, then medical superintendent, and learnt to our deep interest that the sister had suffered from soreness of the throat two days after our swabbing, and was then found to have developed a typical diphtheritic membrane. We had caught her in the incubation stage while numerous bacilli were present in her throat. In the classic experiment of C. G. Guthrie and his colleagues, who applied culture of virulent *C. diphtheriæ* to the throats of medical volunteers, Schick-positive and negative, the former suffered from soreness of the throat with typical diphtheritic membrane approximately 48 hours after the bacilli were applied.

Some years ago I was present at a small children's party; one boy joined vigorously in the games, but periodically retreated to a settee for a few minutes. Next day he showed a measles rash. During his incubation period at the party he infected every child in the gathering who was not already immune owing to a previous attack of measles. It is obvious that during this incubation period or stage of early invasion a person may, in coughing or loud talking, shower minute droplets of highly infective sputum on those in the neighbourhood.

We know that we can obtain Bordet's bacillus from almost every whooping-cough patient early in the disease by exposing appropriate culture plates a foot away from the mouth during coughing paroxysms.

Danger arises also from "missed" cases—i.e., the person with a primary attack of a disease, who manages to carry on some measure of his ordinary activities while passing through his slight disturbance of health and spreading infection to all around. The high percentage of people in certain communities whose blood contains antibodies for yellow fever, poliomyelitis, or diphtheria, indicates how common missed cases or subclinical infections must be. It is clear, therefore, that we risk contagion whenever two human beings meet, and that we can entirely obviate infection for the individual only by preventing access of the infecting agent to him. Here the broad measures of isolation and quarantine described by Dr. Glover apply.

CARRIAGE OF INFECTION

It is extraordinarily difficult to avoid carrying infection. Before attempting to instruct the public in these general measures it is plainly our duty to begin at home. How often does a doctor or nurse carry infection to a patient? Those who have most studied puerperal infection tell us that many doctors and nurses with hæmolytic streptococci in their throats have infected their patients. This danger apparently can be avoided only by asking the bacteriologist to certify that the doctor or nurse harbours no potentially dangerous microbe, or by *efficient* masking.

We are all familiar with the distressing infection of patients with a second disease, while they are in hospital suffering from an illness. If patients with infectious diseases, who are all restricted to bed, are treated in a properly ventilated bed-isolation ward, with each bed retaining 12 ft. of wall space, they can be protected against cross-infection from most infectious diseases. But experts in this method do not like to nurse patients in the early stages of measles or varicella, for here "cross-infection" is highly probable. How does infection spread? Is the virus really carried far, floating in a minute droplet of sputum or mucus expelled during coughing? Or is the virus more resistant to drying and light, and is it carried from one patient to the next by the doctor or nurse? E. H. R. Harries (1924) gave a valuable description of some of the problems. We shall not be able, readily, to solve puzzles of this kind until we have animals susceptible to the diseases under investigation.

Our experience with dog distemper is suggestive. As every kennel owner knows, this is a highly infectious disease, yet by simple precautions, rigidly carried out, we are able month after month to keep simultaneously in a large room numbers of normal ferrets which are highly susceptible to distemper, and ferrets at all stages of the disease. My veterinary colleague, Major Dalling, kindly allows me to say that to test the efficiency of the measures adopted to prevent the carriage of infection he intentionally keeps normal ferrets in metal bins, intermingled capriciously with the bins containing the infected ferrets; yet after approximately 1500 "ferret-days' exposure" during the past two years we have never observed distemper amongst the exposed normal ferrets until, at the conclusion of some weeks of exposure, an intentional injection of distemper virus has been made to establish beyond doubt that the ferrets were not already immune. The attendants wear rubber gloves, gowns, and boots, and after any possible contact with infection wash off with lysol solution all dirt from their hands, clothes, and boots before handling each animal.

I would suggest that it might be possible to nurse in adjoining well-separated beds, small-pox patients and unvaccinated people suffering from other diseases, or "early measles" and susceptible patients, if the doctor, nurse, and attendants of susceptible patients had no personal contact of any kind with the staff looking after patients suffering from small-pox or measles.

The experience of the teams of investigators into human "colds" and "influenza" at Baltimore and New York is illuminating. Here the attendants wear complete masks and gowns and rubber gloves, and the food is sterilised; yet even so, infection may occur, presumably through some momentary oversight.

E. R. Long, in 1932, recorded that during attendance on the carefully isolated chimpanzees at Baltimore one member of the team attended to nine apes. As usual she wore a mask. She herself, some 30 hours later, noted that she had the early symptoms of a cold, which developed typically the next day. On that day—i.e., 48 hours after she had attended the chimpanzees—two of the nine developed a typical common cold. Even the extreme precautions employed did not suffice to protect the apes.

Double interest attaches to the incident because the investigator, at the time when she infected the apes, had no symptoms of a cold, but was evidently in the highly infectious incubation stage.

Investigation of yellow fever provides further information of value. In a surprisingly large number of laboratories in different parts of the world where this disease has been under investigation, some of the workers have suffered attack even where infected mosquitoes were not employed in the experiment. So disconcerting has been this experience that now it is a rule in certain of the largest units to prohibit entry to the laboratory team of anyone who has not been immunised either artificially or by previous attack.

The foregoing considerations emphasise how difficult it is to save the individual from infection in an ordinary community. In other words, we cannot satisfactorily, under modern conditions of communal life and travel, prevent the noxious microbe reaching the individual whom it will afflict.

Destruction or Removal of Infecting Agent

We can further aim at destroying the infecting agent or at preventing it reaching our population after it has left the original patient or carrier. We kill the typhoid bacillus in the fæces by heat or disinfectant, or we remove it from our neighbourhood to struggle for its life in competition with the flora of the sewage farm. To these general measures we owe signal victories over typhoid fever, cholera, and similar diseases, but there still remain many loopholes to be closed by intelligent and thorough application of knowledge now available. The repulsiveness of the thought must not prevent our recognising that the chances of soiling one's hands after defæcation or urination are high. A significant observation made during the war was related to me. About a score of men known to be "urinary carriers" of the typhoid bacillus were stopped as they left the urinal in a military camp and instructed to dip their fingers into culture media. From almost every one typhoid bacilli were obtained. The tragic series of cases of typhoid fever produced in various houses by the classical "Typhoid Mary," and other cooks who were typhoid carriers, force us to believe that cooks repeatedly contaminate with their bacilli-laden fingers the food they prepare. Prof. Hewlett has told you that as late as 1933 an alarming series of infections with amœbic dysentery occurred in and around Chicago, attributable to the fæcal soiling of food by men cooks, carriers of pathogenic amœbæ. It may be that in the near future some progressive local authority will make an experiment and turn its public places of resort into real lavatories, in which each entrant will find convenient provision for hand washing with running water, and an automatic hot-air hand drier—facilities I have seen provided gratis at a continental railway station.

Immunisation

To reinforce our control of infectious diseases, after general measures of isolation and of hygiene have played their part, immunisation comes to our aid.

PASSIVE IMMUNISATION

By passive immunisation we can almost instantly cut short certain epidemics. With a dosage of 1000 units of *diphtheria* antitoxin numberless outbreaks of diphtheria have been scotched. An interesting deduction arises from this practice; since diphtheria outbreaks occurring in many different parts of the world have been stayed, all types of the diphtheria bacillus must be immunologically very closely related if not identical. Passive immunity in the average patient lasts about three weeks. I received a report recently of one fully authenticated infection with diphtheria occurring as early as 18 days after a dose of 1000 units of antitoxin; such a short period of protection must be very rare.

Scarlet fever antitoxin is in routine use for prophylaxis in many hospitals. Though the protection does not seem to be as certain or as lasting as that given by diphtheria antitoxin, it enables the hospital administrator to avoid closing wards in which an unexpected case of scarlet fever has occurred. The contacts are Dick-tested, and those showing a positive reaction receive antitoxin; a dose of 10 c.cm. of a good antitoxin appears in practice to give virtually complete protection for approximately a fortnight.

Measles.—Here our control by immunological methods is not satisfactory and we must rely on the well-proven methods of isolation of patients during the early and most infective stages of the disease. Many parents fail to realise that measles is highly infective before the rash appears; therefore it is wise when a child has any departure from normal health to put him to bed not only for his own sake but also in order to reduce the risk of infecting other children. The only improvement which modern immunology has granted to us flows from the discovery that the serum of a patient who has recently recovered from measles contains a large amount of protective antibody and that a small dose of it—e.g., 5 c.cm. injected into a child within five or six days of exposure—will give complete protection against measles for probably at least two or three weeks. It has in this way saved the lives of many infants already enfeebled by some other disease. If given late—e.g., from the sixth to the ninth day—it may not prevent a slight attack with very mild symptoms. The advantage of this "sero-attenuation" is that the immunity is active and lasts for a considerable period.

Unfortunately in practice it has nowhere proved possible to maintain the full supplies of convalescent measles serum required by the community. The deficiency can in some measure be filled by so-called "adult serum"—i.e., serum of people who have previously suffered from measles and therefore still have a small amount of protective antibody in the blood. It seems clear that large doses of "adult serum"—e.g., 20–30 c.cm.—will prevent the victim from suffering from more than a modified or mild measles (which is naturally followed by lengthy immunity), but it is not equally clear that all samples of this serum will completely prevent the development of the disease as certainly as convalescent serum does. It is well worth remembering in an emergency that, as most adults have suffered from measles, a supply of say 15 c.cm. of blood from each healthy parent immediately injected at two or three spots deep into the buttocks of the exposed child is likely to be effective. If we could discover some manageable

animal which could be readily infected with measles, we might hope to make a serum, as has been done for several animal diseases, notably for dog distemper recently and for yellow fever.

It appears that serum from patients convalescent after *whooping-cough* and *varicella* will prevent the development of the corresponding diseases, but these sera are not yet in common use.

ACTIVE IMMUNISATION

The use of serum is invaluable in emergency but it cannot serve to control the general incidence of disease in the community. The convinced advocate of active prophylaxis maintains that active immunisation will play an incomparably greater part in the medicine of the future. The expectation that in the future rational community the parents of every child will look forward to giving up a few months of the child's life to active immunisation against a number of the dangerous diseases to-day may seem Utopian. The alternative is the system we at present endure. The average parent, on the ground of cost alone, without taking any account of the anxiety and suffering inseparable from illness, cannot fail to be impressed with the saving that would arise from active immunisation against the common infectious diseases of school life, if it were readily available. Dr. Glover has estimated the cost of infectious disease in one public school of 500 boys as £4000 a year. The total cost to the community of lost school days must be huge.

To what degree can we hope for real help from active immunisation in controlling disease? We may group infectious diseases readily into: (1) those where the illness is caused mainly by soluble toxin; (2) virus diseases; (3) bacterial diseases.

(1) For illnesses apparently caused entirely by soluble toxins—so-called "exotoxins"—such as diphtheria and tetanus, we can already promise almost complete protection and control by immunisation with formol-toxoid to those demanding it.

(2) For the virus diseases the future is rich in promise. Against small-pox in man, veterinary virus diseases such as rinderpest, fowl-pox, and true canine distemper, high protection can be given. The key to progress is a supply of virus and a susceptible animal for experimentation. If the immunologist had at his disposal full supplies of the virus of measles, varicella, and whooping-cough, and manageable susceptible animals on which to test them, it is reasonable to expect that within a moderate period he could offer to man an effective method of active immunisation.

Virus may be used to immunise in several ways. (*a*) It may be "detoxicated," or killed by formol, phenol, and so forth, and so become a safe but efficient immunising antigen. (*b*) It may by passage through another animal be transformed into an allied living virus relatively innocuous for man. We are reminded of vaccinia and of the mouse neurotropic strain of yellow fever virus, used for human immunisation. In our own work on distemper we have had at times a virus completely non-lethal to susceptible dogs and of high immunising value, while it was still lethal to ferrets. (*c*) By the injection of small doses into adult volunteers who have long ago suffered from the disease under investigation it is logical to hope to increase, manyfold and rapidly, the concentration of antibody in the blood and so obtain supplies of potent serum for the production of virus-antivirus mixtures for immunisation. Human anti-yellow fever serum is at present being used in this way.

What are our chances of obtaining supplies of virus? The method of growing virus on the chorio-allantoic membrane of chick embryos offers a hopeful harvest. In Dr. Glover's list of illnesses responsible for most of the lost time in schools were found colds, influenza, mumps, and chicken-pox, almost certainly all due to filtrable viruses. Hitherto active immunisation has no record of sound achievement in any of these diseases. The "cold" virus has recently been cultivated by American workers and one may hope that further success in active immunisation of apes and men with cultivated safe virus will be achieved. A group of workers at the National Institute for Medical Research recently made the important discovery that human influenza is transmissible to ferrets.

(3) Will the third group of *bacterial* diseases—e.g., the enteric fevers, pneumonia—prove amenable to active immunisation? W. W. C. Topley, in discussing the implications of his important studies of experimental epidemics in mice, emphasises the value of antityphoid inoculation for animals or man exposed for a limited period, but he is not ready to rely on it where the risk is severe and continuous.

Against infections with the salmonella group, active immunisation of animals apparently offers only temporary aid, but so far as antityphoid vaccination in man is concerned, I have gained a strong impression from talks at various times with clinical friends in countries where typhoid fever is rife that inoculated nursing staffs in hospitals receiving many typhoid patients are now almost entirely free from typhoid fever—in strong contrast to the troublesome infections amongst nursing staffs experienced almost every season in pre-inoculation days. Perhaps in these circumstances antityphoid vaccination does lead to lasting immunity. (I must admit that I have failed to find any long series of figures dealing with this point.)

Pneumonia.—Active immunisation on a huge scale has been tried in the South African mines. It is difficult for the ordinary man, after reading the conflicting accounts available, to reach any conviction that immunisation has been wholly effective in preventing pneumonia, even where such complete control was possible. At all events, active immunisation of ordinary white populations against pneumonia has not yet been widely advocated even by immunologists.

Whooping-cough.—Many attempts have been made to prevent this distressing complaint by active immunisation. T. Madsen and the Scandinavian workers have claimed that the procedure is effective. L. W. Sauer in America has also recently reported his experience with active prophylaxis. Both groups of workers present figures representing gratifying reductions in incidence and death-rate, but more experience is necessary before the best methods of producing vaccine, strength, dosage, and period necessary for the development of full immunity can be decided.

Diphtheria.—After these general considerations, let us take a concrete instance and consider how effective control can be. Diphtheria presents us with an attractive instance of control and prevention, based on a few well-known propositions. (1) The diphtheria bacillus can be readily recognised by culture and, where necessary, animal inoculation; (2) a "Schick-negative" child can be regarded as almost completely protected against diphtheria; (3) antitoxin will give immediate protection lasting approximately two or three weeks; (4) it may be very difficult to "cure" carriers of true virulent *C. diphtheriæ*.

Let us assume that a severe outbreak has occurred in a school containing some hundreds of children. The following programme will rapidly enable one to control the outbreak with a feeling of confidence.

(*a*) Schick test all inmates; 24 hours later separate the Schick-negative from the positive. Look through

the presumed "negative" group daily for seven days to detect any children showing a delayed positive reaction; remove them, as soon as they are found, to the Schick-positive group.

(*b*) Allow the negative group to go on with their normal activities; they are virtually safe from attack.

(*c*) Examine throat and nose swabs from all in the positive group. Separate those whose overnight cultures show "morphological K.L.B." See this group daily, for it is here one may detect a very early attack in a child, perhaps in the incubation stage.

(*d*) Watch this group carefully for about a week after the last case of diphtheria; then commence active immunisation with the strongest prophylactic available (at present formol-toxoid or toxoid-antitoxin floccules). Give three doses of 1 c.cm. at fortnightly intervals. Schick-test the group two weeks after the final injection of toxoid and give a further 1 c.cm. to any who may be still Schick-positive.

(*e*) Thereafter test all new entrants and immunise where necessary.

I know of an institution which had spent approximately two thousand pounds in two years on the older methods of giving antitoxin and swabbing, but without avail. The method above outlined was applied with complete success. No further cases of diphtheria occurred and within a short time the whole of the Schick-positive inmates had been converted by active immunisation to Schick-negative. All entrants are tested and, if necessary, immunised; the school has remained free from diphtheria since.

Whether the disease in the general population will ever be brought entirely under control depends on the will of the community. Each improvement in certainty, rapidity, and simplicity of immunisation will increase the numbers of people who wish their children protected. As soon as one-third of the children under five and two-thirds of those over five are Schick-negative, we may confidently count on a material reduction in the incidence of diphtheria.

There are two tasks challenging the biochemist to whom the immunologist looks for help.

The first is to prepare diphtheria toxin free of the constituent which causes the "pseudo" reaction. We are justified in assuming that these two principles are different. If this task is achieved it will no longer be necessary in the Schick test to inject heated toxin, the so-called "control fluid," in order to detect pseudo reactors. It is also a reasonable assumption that we shall be able to avoid all, or almost all, of the local and general reactions which may follow the injection of powerful prophylactic if we can succeed in preparing a pure toxin or toxoid molecule without the so-called "non-specific" bodies attached to it. The second task is to find how best to anchor the antigenic toxin or toxoid molecule locally in the tissue. It is fairly clear from the work of A. T. Glenny, G. A. H. Buttle, M. F. Stevens, and others that the greater part of an ordinary injection of toxoid is eliminated from the body, and only a very small fraction plays the essential part in producing immunity. The problem is, therefore, to find how best to prepare our hypothetical "pure toxoid"; we must then mix with it some substance—e.g., alum—in appropriate form, so that the whole of the toxoid molecules introduced will come into play and produce immunity.

Toxin "detoxicated" with formalin was first used for human immunisation in 1923 by G. Ramon, and a few months later by E. H. T. Nash in London. It has been familiar for many years to immunologists that toxoid is an excellent immunising material. Its one drawback consists in its liability to cause, in rare "sensitive" subjects, troublesome local temporary inflammation or œdema at the site of injection, sometimes accompanied by fever and other general symptoms. These are due almost certainly to bodies other than pure toxoid. P. G. Moloney and D. T. Fraser in Toronto, by a simple test, taught us how to pick out the rare individuals liable to suffer from these reactions following injections. A minute amount of diluted toxoid is injected intracutaneously into the patient's forearm; if he is a "sensitive" subject there will be found, within 24 to 48 hours, at the site of the injection, a red flush, perhaps with some slight induration. A child showing this flush may be treated in three ways:—

(1) He may be left unimmunised; as about two-thirds of reactors of this kind already have some immunity, the risk arising from this practice is not great.

(2) He may be injected with toxoid-antitoxin-floccules; reactions after the administration of this material are very rare.

(3) He may be immunised with a series of five or six doses of toxoid—the first being very small—e.g., 0·02 c.cm., the succeeding doses being perhaps 0·05 c.cm., 0·1 c.cm., 0·2 c.cm., 0·5 c.cm.

Scarlet fever.—For scarlet fever the story is similar but on a slightly lower note of confidence. The causative microbe—hæmolytic streptococcus—is not so characteristic as that of diphtheria, for it cannot readily be distinguished from other hæmolytic streptococci, which may not be erythrogenic.

Admitting its limitations, I would suggest that the usefulness of taking swabs and making cultures in cases of suspected scarlet fever is not sufficiently recognised. A trained pathologist with suitable blood plates can obtain from the great majority of cases of true scarlet fever, plates with numerous hæmolytic streptococci generally becoming, within 24 to 48 hours, recognisable by the naked eye. This procedure, aided at times by the Schultz-Charlton test, may be of the greatest service to a perplexed practitioner faced with a patient showing fever and an atypical rash. The naturally Dick-negative person has almost complete immunity against scarlet fever, but the one made negative by immunisation does not appear to have quite as satisfactory immunity. Further, the protection given by antitoxin is apparently not quite as absolute as in the case of diphtheria, nor does it last as long. Finally, it is more difficult to convert the Dick-positive reactor into a negative. Four or five doses are required before one turns the majority of people from Dick-positive to Dick-negative. In the early days some mistakes were made in the dosage and it was noted that after too large an initial dose—e.g., 2000 to 5000 skin test doses—some children within 24 to 48 hours would suffer from so-called "miniature scarlet fever" with a scarlet rash and high temperature. The infection was self-limited by the amount of toxin introduced, and the patients recovered in three or four days. Unfortunately there are no accurate records to show what percentage of these patients rapidly became Schick-negative, as after scarlet fever. My impression is that the percentage was high, and that if we could discover how to give a large dose of toxin just short of producing this "miniature scarlet fever" we could much hasten the change to the Dick-negative condition. Hitherto formalinisation has not helped us to achieve this object. Dr. Dick reports that of 12,584 nurses and resident medical officers, all Dick-negative, working in fever hospitals, not one was attacked by scarlet fever. J. G. FitzGerald in Toronto reports a similar satisfactory result in nurses, and E. H. R. Harries, W. T. Benson, and others have been equally successful in England.

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SPECIAL ARTICLES

DIET AND THE TEETH

THE third and last volume of Mrs. Mellanby's work on the effect of dietary factors on the development of the teeth has just been published.[1] The work previously published set out the thesis that the liability of a tooth to decay depends largely upon dietary factors responsible for the perfection of its structure at the time when it was first formed. Ill-formed teeth are common and these are the teeth that are likely to be invaded by bacteria. Secondly, apart from the original constitution of the tooth, its resistance to decay is influenced throughout life by the quality of the diet. Mrs. Mellanby's connexion of vitamins D and A with tooth and gum structure has already had a disturbing effect on dental science. The crucial test, however, must be a transference of the experimental work from animals to man, and that is the subject of the present report.

A histological examination of large numbers of human teeth showed that a normal or perfect one is rare. Most of them showed some defect such as surface roughness, pigmentation or discoloration of the enamel, and interglobular spaces in the dentine. These are the defects produced in experimental animals by diets deficient in vitamin D. These variations are called by Mrs. Mellanby "hypoplasia," the term "gross hypoplasia" being reserved for defects which had previously been recognised. She examined over two thousand shed and extracted teeth, chiefly deciduous teeth, and also children's teeth in situ in Sheffield and Birmingham.

DEVELOPMENT AND STRUCTURE OF HUMAN TEETH

After a review of normal development and structure, Mrs. Mellanby discusses the various departures from normality which she groups under the term hypoplasia. Enamel seems to calcify in two main stages, the tissue being first deposited in a semi-calcified state and later becoming fully calcified. If the first process is slowed down the resulting enamel will be less than normal in quantity but may be of quite good quality. When the second stage is interrupted the enamel will be deeply pigmented or irregular. During the development of the dentine the odontoblasts continuously secrete an organic matrix which is soon further calcified, so that at any given time there is only a narrow band of uncalcified tissue—the odontogenetic zone. Abnormally, both processes are often slowed down. The precipitation of the calcium salts usually lags behind that of the matrix, so that the odontogenetic zone is thickened and irregular. The calcospherites either do not coalesce or only partially coalesce leaving poorly calcified areas, the so-called interglobular spaces, or, in less extreme cases, areolar dentine.

Very few of the deciduous teeth were found to have a smooth shiny surface and nearly all of them had some degree of discoloration. The normal permanent tooth is generally slightly rougher than the normal deciduous tooth but, allowing for this, most of the permanent teeth examined showed some defect. Mrs. Mellanby classes "gross hypoplasia" as: syphilitic, infantile, febrile, general, or local. One or other form was found in about 10 per cent. of cases. Histologically many variations in the enamel were seen and their significance was not in all cases ascertained. Abnormalities of dentine had two main histological characteristics: decrease in quantity and presence of interglobular spaces or areolar tissue. Correlation of the surface texture and minute structure of the same teeth after sectioning made it possible to infer the histological structure of teeth while still in the mouth.

Analysis of all the data showed that, whether the tooth is examined macroscopically or microscopically, the majority of deciduous teeth are hypoplastic. The incisors are better calcified and the second molars worse calcified than any other type of tooth. The teeth from private sources were better calcified than those from public elementary school-children. The majority of the permanent teeth examined were also hypoplastic. It was rare, however, to find all parts of the tooth imperfect. In most of the deciduous teeth the part formed before birth was well calcified however hypoplastic the rest might be.

DENTAL CARIES

Mrs. Mellanby pleads for a standardised method of collecting and correlating data about caries. There is not even a satisfactory definition of the condition. Of her collection of deciduous teeth 27 per cent. were free from caries and 42 per cent. were very carious. Caries was absent in 67 per cent. of the incisors but only in 4 per cent. of the second molars. There was not previously any evidence, based on animal experiments, of association between the structure of teeth and their liability to caries. The correlation of Mrs. Mellanby's observations on the presence of hypoplasia and the presence of caries in the same teeth provides an interesting basis for establishing the relationship. In her series of 1500 deciduous teeth examined microscopically, normal structure was associated with a low incidence and degree of caries, and caries was more extensive in hypoplastic teeth and most extensive in teeth showing severe hypoplasia.

There was no caries in—

78 per cent. of teeth normal in structure.
46 per cent. of slightly hypoplastic teeth.
8 per cent. of moderately hypoplastic teeth.
6 per cent. of very hypoplastic teeth.

On the other hand, extensive caries occurred in—

7·5 per cent. of teeth normal in structure.
13 per cent. of slightly hypoplastic teeth.
46 per cent. of moderately hypoplastic teeth.
74 per cent. of very hypoplastic teeth.

With normal structure there was no caries in—

89 per cent. of teeth from private sources.
63 per cent. of teeth from public elementary school-children.
77·5 per cent. of teeth from foreign sources.

With severe hypoplasia there was much caries in—

49 per cent. of teeth from private sources.
77 per cent. of teeth from public elementary school-children.
76 per cent. of teeth from foreign sources.

In general, the relationship between surface enamel structure and the extent of caries was close: the greater the degree of histological enamel defects the more extensive the caries. Estimation of the structure of the tooth by surface examination gave the same ratio as histological examination. The association between quality of structure and incidence of caries was quite as close in the simple front teeth as in the complex molars. A similar correlation was found in the permanent teeth. There are, however, a few exceptions to the rule of association between primary structure and the incidence of caries. To account for these Mrs. Mellanby suggests that there

[1] Medical Research Council, Special Report Series No. 191. H.M. Stationery Office. Pp. 180. 5s.

may be a change in the resistance of a tooth after eruption, and that this would be indicated by the character of the secondary dentine. She only found 2 per cent. of gross exceptions to these two hypotheses in all the 1500 teeth which were studied.

DIETARY EXPERIMENTS

The environmental conditions of the teeth had also to be investigated to complete the research. A number of children suffering from bone tuberculosis, and living under excellent hygienic conditions in a Sheffield hospital, were made the subject of this part of the work. One group of children was given a potently calcifying diet, another a less calcifying diet, and a third a diet of poor calcifying properties. These differences were obtained by varying the fat-soluble vitamin, calcium, and phosphorus content, and the amount and type of cereal. All these diets, from the ordinary standpoint, would be considered satisfactory, for their energy value and their fat, protein, and carbohydrate content were adequate and good variation was possible. At the beginning of the investigation the three groups were roughly comparable. At the end of the investigation there was an increase of caries in each group, but a significant difference between the three. The number of teeth per child showing initiation or spread of caries was 1·4 in those who had extra milk and fat-soluble vitamin and 5·1 in those whose milk and vitamin content was cut down while the cereal was increased. A second investigation repeated the experiment on a larger scale with similar results. It was also found that a high calcium content of the saliva could be induced by a diet containing plenty of fat-soluble vitamin, and a low calcium content by a diet containing much cereal, especially oatmeal, and a comparatively small supply of fat-soluble vitamin. A third investigation attempted to vary nothing except vitamin D intake in the diet. The results showed that vitamin D caused a tendency to the arrest of caries and to the prevention of its appearance. Variations in the calcium and phosphorus of the diet were not of primary importance.

Nevertheless, the spread of caries was not delayed in all the children on a given diet or in all the teeth of any individual child. It was recognised that some local condition in the mouth or some other food factor might explain the exceptions, and the cereal intake was therefore studied. A group of children was given a diet rich in vitamin D and calcium but containing no cereals, while another group was given a similar diet with cereals. Children on the ordinary hospital diet were used as controls. The results showed that a diet rich in vitamin D and calcium and devoid of cereals has greater inhibitory and curative effects in dental caries than any other diet hitherto tested. A characteristic result of this diet was gradual hardening of the soft dentine and the arrest of all progress of the disease.

RELATED PROBLEMS

In the course of the work it was noticed that the diet of institutions seemed on the whole to be better from the point of view of dental resistance than family diets of children of the corresponding social group. In a small number of cases extra vitamin D was given to children or taken by pregnant women, and the resulting teeth when investigated were found to be of good structure and resistant to caries, but not all perfect or free from caries. No disease was found in most of the teeth under the age of six. This work still requires confirmation on a larger scale.

Dental hypoplasia and rickets were found, in Mrs. Mellanby's earlier work, to be definitely related in animals, and this report records an investigation of 200 rickety children. An examination of their teeth suggested that a much larger proportion of them were lost prematurely and that they showed a wider spread of caries than in corresponding non-rickety children.

Certain races seem to show an immunity to dental caries: people living in the tropics or arctic regions have far fewer decaying teeth than those who live in temperate zones. The immune communities are usually isolated from contact with civilisation, but show all varieties of diet, clothing, and exposure to sunlight. Many of them seem to consume large quantities of carbohydrates. One feature that they all have in common is the habit of prolonged breast-feeding. If the maternal diet is adequate, breast-feeding ensures the optimum calcifying effect during a very important period of tooth development. A second outstanding fact about these immune peoples is the large amount of vitamin D they obtain. There is experimental and clinical evidence showing that a diet with large cereal content is compatible with perfect dental development, provided that the child is breast-fed and has plenty of milk and vitamin D after weaning; that perfect teeth are known when the carbohydrate of the diet is obtained largely from potatoes and other vegetables instead of cereals, and breast-feeding is prolonged, even if there is not much vitamin D available; and that with prolonged breast-feeding and plenty of fat-soluble vitamin and little or no cereal, perfect teeth can be produced in the comparative absence of ultra-violet light and with comparatively little calcium. The geographical distribution of dental caries does not suggest that oral hygiene is essential for the prevention of disease. Where oral hygiene is extensively practised caries is common. Mrs. Mellanby has not been able to find any support for the suggestion that vitamin C is important in the production of caries.

CONCLUSIONS

The conclusions to which Mrs. Mellanby is led as the result of her work are these:—

"In order to reduce substantially the incidence of dental disease, especially in temperate zones, it is necessary to introduce large changes in the diet and habits of pregnant and lactating women, of infants, and of children during the whole period of dental development and, indeed, during the whole life. The consumption of milk, eggs, cheese, animal and fish fats, and vegetables must be greatly increased, and the consumption of cereals correspondingly diminished, and for the very young abolished. Breast-feeding must be general and prolonged even up to a year or more, provided a supplementary diet is given after about six months, which should include some iron and vitamin C. Cod-liver oil or some other source of fat-soluble vitamins should be given to all infants and children.

"These, then, are the general principles of feeding which will certainly result in the formation of more perfect teeth and surrounding tissues, more regularly arranged in well-grown jaws. With better structure of dental tissues and increased resistance to bacterial invasion there is every reason to believe that both dental caries and pyorrhœa will cease to be the scourge they are at the present time."

STAFFORDSHIRE MENTAL HOSPITALS.—In approving the estimates for 1934-35, the Staffordshire mental hospitals boards fixed the patients' maintenance rate at 17*s.* 10*d.* per week. It was, however, pointed out that this is considerably below the actual cost, and that the rate will probably have to be substantially increased when the next budget is presented.

MEDICINE AND THE LAW

Nitrous Fumes Cause Death

THE death of William McDonald, investigated by Dr. R. L. Guthrie at an inquest held at Poplar on Jan. 20th, was found to be due to an unusual and unexpected cause. The deceased man had been in charge of operations with an oxy-acetylene "super-warmer" on the *Dunbar Castle* lying in the West India Dock. A man working under his directions stated that he could go on no longer, owing to the overpowering fumes causing difficulty in breathing. Mr. A. Stevenson, chief of the technical staff of the British Oxygen Company, stated that there had been no previous fatalities when the super-warmer was used and that, before it was allowed to play on a surface, paint which might give off lead fumes should be removed. An engineering inspector of factories stated that tests made on the *Dunbar Castle* showed that as much as 102 parts per million of nitric oxide were produced when the appliance was working, and that 40 parts per million were dangerous. It was not previously known that the super-warmer might produce dangerous amounts of nitrous fumes. Medical evidence showed that death was due to asphyxia which could be explained by the presence of so much nitrous fumes. A verdict of accidental death due to insufficient ventilation was returned, with the recommendation that in future improved ventilation should be provided. It does not seem to be generally recognised that the oxygen and nitrogen combine to form nitric oxide when air is heated, and this in turn is rapidly oxidised to N_2O_3 and NO_2. Evidence of nitrous acid can be found even in the smoke from a cigarette or the air round a red-hot wire. At the temperature of an oxy-acetylene flame a considerable production of nitrous gases would no doubt take place. The use of such appliances in confined spaces is obviously dangerous.

A Physio-medical Practitioner

Anyone who is in need of medical attention, said the coroner at a Southport inquest last week, is at liberty to call in a blacksmith, a wheelwright, a carpenter, or a man who sells treacle or soap. The people thus called in are entitled to accept the invitation. It is, added the coroner, all a matter of choice; personally, he himself preferred the registered medical practitioner. But whoever accepted the invitation had a certain duty to perform. Mr. Brighouse made these observations in a case where a retired coal dealer, aged 61, had been attended by Mr. Arthur Boothman, a "physio-medical practitioner," of Arbour-street, Southport. Mr. Boothman had given what was described as a certificate to the effect that the cause of death was diabetes and pulmonary congestion and exhaustion. Dr. W. E. Cooke, pathologist to Wigan Infirmary, described the conditions disclosed by a post-mortem examination. The right foot was black and shrivelled; when he unwrapped the bandages the foot separated from the leg at the ankle-joint. In Dr. Cooke's opinion death was due to cellulitis of the right leg, brought about by gangrene of the right foot. In reply to the coroner he said that amputation would have afforded a good chance of recovery; the trouble was not curable by pills or medicine. Questioned by a legal representative on Mr. Boothman's behalf Dr. Cooke said he found no evidence of diabetes; gangrene frequently supervened upon a diabetic condition. Mr. Boothman, aged 32, stated that he had practised for two years as a physio-medical practitioner; about 17,000 people had passed through his hands and he had never had a fatal case before. He claimed that the deceased's leg had healed under his treatment. Asked by the coroner why he made no mention of the leg on his "certificate," he explained that he thought the primary cause of death was diabetes. The jury returned a verdict that Mr. Boothman had discharged his duty "to the extent of his knowledge." The coroner directed them to retire and give an answer to his question without qualification. They then returned a verdict that Mr. Boothman had discharged his duty. The verdict negatives a charge of criminal negligence.

One of the few limitations upon the scope of the unregistered practitioner is the disability which prevents him giving a valid certificate of the cause of death. Hence when the unregistered practitioner's patients die a post-mortem examination and inquest may well be inevitable. It seems confusing and irregular to dignify by the name of "certificate" a document which presumably amounts to no more than a notification of the fact of death. It is perfectly true that a sick person may (as Mr. Brighouse breezily explained to the jury) invite the ministrations of a blacksmith or a seller of soap; he is free to choose. In the interests of public safety we have evolved a system of death registration which requires that the best information be given of the cause of death. There is not the slightest suggestion of any irregularity in the death of Mr. Boothman's patient, but it is highly misleading that what purported to be a statement of the cause of death should have omitted to mention the condition of the right leg, and should have mentioned diabetes of which a post-mortem examination showed no evidence. While such mistakes can occur, it is hardly safe to relax the law.

IRELAND

(FROM OUR OWN CORRESPONDENT)

ST. VINCENT'S HOSPITAL CENTENARY

DURING the past week St. Vincent's Hospital, Dublin, celebrated the centenary of its foundation. It was in 1834 that Mother Mary Aikenhead, a Sister of the Order of Charity, opened a hospital ward in a fine old mansion in St. Stephen's Green, which had previously been the town house of the Earl of Meath. This ward—formerly the drawing-room of the house—is still in daily occupation. From the first the hospital gained public confidence, and Mother Mary Aikenhead's courage won the support of the public. The hospital, which is still under the control of the Sisters of Charity, is one of the most progressive in Dublin, and the Sisters have shown an eagerness for scientific advance not less than their religious benevolence. Although controlled by a religious order the benefits of the hospital are open to patients of every creed. The staff in the past, as in the present, has included many of the most distinguished physicians and surgeons in Dublin. At present it has some 250 beds and a large nursing-home attached, while its training school for nurses has the highest reputation. The centenary celebrations included various religious and social functions in which many guests took part. The medical profession of Ireland joins in congratulation to their colleagues at St. Vincent's on the completion of a hundred years of charitable and scientific work.

CORRESPONDENCE

BATTLE OF THE BARBITURATES

To the Editor of THE LANCET

SIR,—Now that time has elapsed since the joint meeting of the sections of therapeutics and psychiatry of the Royal Society of Medicine I hope that it will be possible to look into this subject, not in the way that some regard it as a dispute between physicians with varied opinions, but rather as an attempt by all to discover the truth amidst a somewhat chaotic mass of material.

That the matter is of importance there can be no question, as the effective treatment of sleeplessness strikes at the very root of prevention of mind disorder. Insomnia, if unrelieved, is an important factor in bringing about confusion of the mind, and I have little doubt that as a cause of suicide it far overstrips any one method which may be used to bring about this tragedy. Suicide is based upon the will to end an unbearable existence, and it is to prevent this that every physician must direct his energies when confronted with it.

Now it is around this endeavour to prevent mind disorder and suicide that this discussion is taking place. On the one hand there are a group of men whose duty it is to find out how best they can prevent mind disorder, or how they can keep in health persons whose defective sleep is the only factor standing between them and their work. On the other side there are distinguished toxicologists, one of whom at least has volunteered the statement that he has never prescribed a single one of the largest group of the drugs used for many years to combat sleeplessness. The reason given is that he regards them as dangerous. Surely no physician is reckless of the interests of the patient under his care. I can only speak for myself when years ago I had to turn to the barbituric-acid groups because other drugs were ineffective or produced bad effects. I appreciated the risk of using unknown and untried medicines, and in consequence I had to watch for any ill-effects and use all known methods to test the general health of the patients taking them. Even to-day, after using this group of drugs for many years, I confine myself to those I know and have learnt how to use. On the other hand, I should consider myself unworthy of my profession if I ceased to give of my best to my patients merely because of certain alleged dangers which in a large and difficult class of practice I have rarely and in some instances never seen.

Sir William Willcox, distinguished as he is, has not, if he will forgive me saying so, helped us. He has never ceased to warn us, but the evidence which he has put before us from time to time is bewildering. He used to quote the experiments of Pickworth and Woodhouse as proving that the barbituric-acid group led to mucinoid deposits in the nerve-cells when administered to monkeys and cats. In 1927 I pointed out to him, during a correspondence I had with him in the medical press, that the amount of veronal these animals were having in these experiments was equivalent, weight for weight, to grs. 500 of veronal per night in man. He never admitted the error, but since then he has ceased to quote these experiments; I can only presume he was satisfied that these experiments were fallacious. That this was the case has since been proved, as in control cats, where no veronal had been given, mucinoid changes took place when the cats were placed under experimental conditions. Next we come to the work of Dr. Young on all the known cases of poisoning by the barbiturates up to 1927, which Sir William Willcox has also quoted as supporting his views. Now Dr. Gillespie tells us that he has investigated every case to test the accuracy of the figures given, and stated that he found that patients had been counted twice or three times over, which greatly reduced the figures given when the corrections were made. Again we are told that the barbituric-acid group are responsible for a large number of suicides. Dr. Gillespie took the trouble to examine all the last available records issued by the Registrar-General and found that out of the 5147 deaths from suicide in 1931, the last year of the completed records, only 13 resulted from taking barbiturates.

Sir William Willcox speaks of veronal addiction as common, and yet in a long life, practising among the very class in which one would expect to find these persons, I can honestly say that I have never seen a pure veronal addict. In the few that I have met, veronal was only one of the many drugs taken by the person, and it never was the one upon which he had started his drug-taking career. My experience, I know, is borne out by that of other men whose work is in the treatment of neuroses and psychoneuroses.

So convinced is Sir William Willcox of the toxicity of the drugs in question, notwithstanding that he has no clinical experience of this toxicity in therapeutic doses, that he now presses for increasing restrictions in their use. In theory how excellent are restrictions, in practice how difficult to carry out, unless these drugs are placed on the dangerous-drug list which even Sir William Willcox himself, I take it, would not advise. Restrictions will penalise those who follow medical advice, but will almost certainly be easily circumvented by the degenerate. Also let it be remembered that even if a very limited amount is prescribed at a time, it does not prevent the would-be suicide from collecting these doses rather than taking them as prescribed. The restrictions which already surround the treatment of mind disorder are serious enough, and to add more would be tragic. Are we to regard normal men and women as potential suicides just because for some reason or other their sleep has become defective and requires treatment?

Nevertheless if it is proved that these drugs are a menace to the nation then nothing must stand in the way of defeating it. All I can say is that if this is the case I have not observed it. If we are to have more restrictions then let the important ones come first and let there be a law against the publishing of the methods used by persons for suicidal purposes. The would-be suicide is very open to suggestion and it is grievous to see this suggestion so freely given.

I am, Sir, yours faithfully,

MAURICE CRAIG.

East Preston, Sussex, Jan. 29th, 1934.

MUCOUS COLITIS

To the Editor of THE LANCET

SIR,—I was unfortunately unable to be present at the meeting of the Royal Society of Medicine when colitis was discussed, and to which you referred last week (p. 198) in an annotation. May I be allowed to differ from Dr. Hurst? Colitis is still very common indeed. This fact may not be realised because certain important diagnostic points are often overlooked. The first is the presence of rectal pyrexia of between 99° and 100° F. after half an hour's rest. The second is the discovery of very long dense masses of mucus, which only appear

after colonic lavage has been continued for a considerable period, and which disappear as the clinical state improves and rectal pyrexia vanishes. I submit that one main cause is an hereditary diathesis of allergic type, and one which is frequently associated with the presence of a relative lymphocytosis and intestinal non-lactose fermenting organisms, and with a small intestinal poisoning. Nasal sepsis is also often present.

You quote Dr. Holmes as stating that natural waters should be given in intestinal lavage in quantities not greater than two pints. How can this quantity effectively reach the cæcum which is so often one of the most important sites of infection? I have found that four or five pints may be necessary and that this quantity can be given with great gentleness if administered by an experienced person.

It may be argued that a successful result from treatment suggests the diagnosis as being accurate. I am inclined to think that, if a preliminary diagnosis is made by someone accustomed to dealing with this condition, and if the treatment is carried out by an assistant skilled in the necessary method, then the large number of successful results will prove that colitis is a common state.

I am, Sir, yours faithfully,

HENRY W. HALES.

Portland-place, W., Jan. 29th, 1934.

POTENCY OF VITAMIN PREPARATIONS

To the Editor of THE LANCET

SIR,—I should like to support very strongly Prof. Drummond's suggestion that advertisements of substances containing vitamins should state the vitamin potency of such substances in international units.

In his letter in your issue of Jan. 13th Prof. Drummond gave the values of the various units already in use in the United States of America in relation to international units. They are the figures given "for the benefit of manufacturers or others who wish to know the approximate relationship between units they are now using and international units of vitamins A and D" by the U.S.P. Revision (Vitamin) Committee in Bulletin 20, the announcement of the new standard for U.S.P.X. cod-liver oil. Some such approximations were obviously necessary in changing from units already in use to units which were deemed to have certain advantages over the old ones. But in any such change there are inevitably grave difficulties. The chief difficulty in this change is the fact that the old U.S. units were defined in terms of animal reactions—e.g., the Sherman unit for vitamin A was that amount which produced an average increase in weight of 2–3 g. per week for five weeks in rats which had ceased to grow on a diet deficient in vitamin A. Now, work in the Pharmaceutical Society's laboratory has shown how great may be the variation in response of different groups of rats to the same dose of the same sample of cod-liver oil at different times. According to the Sherman unit the vitamin-A potency of this oil has varied as much as 500 per cent. The highest values were obtained towards the end of the work, and if the vitamin-A potency of the oil had been calculated in Sherman units at that time it would have been five times as great as if it had been calculated in the same units earlier in the work. It is impossible to think that the vitamin-A value of the oil increased. It must, therefore, be accepted that the animal response varied in our colony very much, and there is no reason to suppose that our variation was greater than that in any other laboratory.

The only way to get the same estimation of the vitamin-A potency of a substance at different times and in different laboratories is to have a standard of reference of which a given weight is accepted as a unit. The international units are based on such standard preparations, but it is obvious from the foregoing remarks that it is necessary to make a simultaneous test of the standard whenever a test of another substance is made. It is not enough to make a test of the standard when it is first received and then interpret all subsequent results by comparing the response of the test animals with the response once obtained by a test of the standard.

With regard to the figure 1·4 quoted as an approximate ratio between the Sherman unit and the international unit for vitamin A, perhaps I may refer to a recent result obtained in this laboratory. A dose of 0·1 g. butter produced a mean increase in weight of about 39 g. in three weeks, or about 13 g. per week. This would correspond to about 5 Sherman units and the butter might be said to contain 50 units vitamin A per gramme. At the same time a test of 1 mg. of a particular sample of cod-liver oil produced a mean increase in weight of about 36 g. in three weeks, a result very similar to that obtained by 0·1 g. butter. Now, after very careful work, we consider this sample of oil to contain about 1600 international units per gramme. Therefore, 1 mg. of it contains 1·6 international units, and 0·1 g. butter (being equal to 1 mg. of the oil) contains 1·6 international units; and the butter contains 16 international units per gramme, which is only about one-third the number of the Sherman units. Thus, while the ratios given by the U.S.P. Revision Committee between the different units may be accepted as some guide in the interpretation of old results they must be accepted with some hesitation, and all future estimations must be made by comparison with simultaneous tests on the international standards of reference. In fact it almost appears desirable that within a reasonable time any statement of the vitamin-potency of a substance should be accompanied by the statement "as determined by comparison with a simultaneous test on the international standard."

As similar periodic variations in response to vitamin D have also been noted, the argument just made for vitamin A applies to vitamin D also.

I am, Sir, yours faithfully,

KATHARINE H. COWARD.

Pharmaceutical Society of Great Britain, Bloomsbury-square, London, W.C., Jan. 23rd, 1934.

LIGHTNING-STROKE

To the Editor of THE LANCET

SIR,—With reference to the article on the Neurological Effects of Lightning by Dr. Critchley in your issue of Jan. 13th it may be of interest to say that I, one of the victims referred to on page 71, am in good health at the present moment though suffering from a certain disability. After about seven weeks as a patient in the Lambeth Hospital I was able to resume my clerical duties, although I am still unable to make full use of my left arm; this was dislocated and terribly bruised as the result of my being hurled some 20 yards from the spot where I was struck down.

I have not heard the subsequent history of my fellow victim since the occurrence in July, 1932, but I shall always regard my escape from instant death as miraculous.—I am, Sir, yours faithfully,

ONE OF THE PATIENTS.

Kennington, S.E., Jan. 19th, 1934.

ACUTE HEPATIC ATROPHY IN PULMONARY TUBERCULOSIS

To the Editor of THE LANCET

SIR,—We are indebted to Dr. Parkes Weber for pointing out that pulmonary tuberculosis may be a possible exciting cause of acute hepatic necrosis, and for the references to the literature on the subject which he has quoted. Our interest in hepatic necrosis in pulmonary tuberculosis is largely in connexion with sanocrysin. We have had several cases of marked jaundice following the administration of sanocrysin which we considered were due to metallic intoxication, and we have come to regard any degree of jaundice or other symptoms pointing to liver involvement as a definite contra-indication to sanocrysin.

There is no doubt that sanocrysin has been associated with marked necrotic changes in the liver (Clarke, B. R., Tubercle, 1925–26, vii., 534) and, as Dr. Parkes Weber points out, pulmonary tuberculosis is also occasionally associated with somewhat similar changes in the liver. It seems to us, therefore, that in those cases of pulmonary tuberculosis to whom sanocrysin is given, and who develop hepatic necrosis, the question arises as to whether the condition is due to one or other of these factors acting independently or acting conjointly, and, if the latter, whether sanocrysin has any modifying action either on the liver or on the tuberculous lesion which would make the patient more liable to hepatic necrosis.

Finally, we should like to express our agreement with Dr. Parkes Weber that the term "acute yellow atrophy" is out of date, and our only justification for using it is that it still appears in most of the text-books of medicine to which we have had access.

We are, Sir, yours faithfully,

ALAN LYNN,
JOHN S. B. MACKAY.

Cheshire Joint Sanatorium, Jan. 26th, 1934.

ADENOID AND TONSIL OPERATIONS

To the Editor of THE LANCET

SIR,—To my mind the unfortunate result of Mr. Layton's article is that the public through the lay press will get an exaggerated view of the dangers of tonsil and adenoid removal which is not borne out by statistics. Also one is unable to give them the other side of the picture, which is the true one. Careful investigation of the after-results, both immediate and remote; have shown me that complications are a rarity if the following precautions are taken:—

(1) Never operating when the patient has had, is going to have, or has a "cold" or sore-throat; also never when the temperature is above 98·4° F. And if possible preceding the operation by a period of abstinence from smoking, using a gargle, and doing what dental treatment is necessary.

(2) When operating avoiding damage to the faucial pillars and extracapsular structures and conserving as much mucous membrane from the surface of the tonsil as possible. Also avoiding much manipulation in the postnasal space after removing the adenoids.

(3) Careful after-treatment by gargling, spraying, or if necessary light swabbing to keep the operation sites free from slough and clot. This is as important as the proper performance of the operation.

After-care may be necessary to correct previous bad habits in breathing and talking. Pain referred to the ears is not uncommon but, actual inflammation is. Of course it is well known to the profession that operative treatment of the adenoids, especially, is helpful in children's ear troubles. In estimating the condition of the tonsils and adenoids it is always necessary to bear in mind the possibility of an infected nasal sinus as the underlying cause.

I am, Sir, yours faithfully,

C. HAMBLEN THOMAS.

Harley-street, W., Jan. 30th, 1934.

To the Editor of THE LANCET

SIR,—The opinions expressed by your contributors are unfortunately finding their way with increasing frequency into the lay press, and are read by many persons unable to appreciate them critically. Thus the generalisation made by Mr. T. B. Layton in your issue of Jan. 20th (p. 117) that "the operation" of tonsillectomy "is never 'absolutely necessary'" is the kind of statement calculated to mislead a wide public, for it is, in my opinion, untrue.

Some few years ago I advised a woman (aged 37) who had "obviously diseased" tonsils and a history of recurrent attacks of acute tonsillitis to have them removed without undue delay. In this opinion her own doctor supported me. As she was very averse to operation she consulted still a third practitioner who, doubtless holding Mr. Layton's views, recommended palliative treatment. Within a month the patient had another attack of tonsillitis and died of septicæmia.

If then the operation I advised was not absolutely necessary, I should like to know what is?

I am, Sir, yours faithfully,

Exeter, Jan. 25th, 1934. ROBERT WORTHINGTON.

THE SERVICES

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Sub-Lt. W. E. Pycraft to be Surg. Lt.

TERRITORIAL ARMY

Lt.-Col. A. La T. Darley, having attained the age limit, retires and retains his rank, with permission to wear the prescribed uniform.

Capt. G. L. Montgomery from Supern. for serv. with Glasgow Univ. Contgt., Sen. Div., O.T.C., to be Capt.

Lts. A. Glen and R. V. Facey to be Capts.

D. E. Denny-Brown to be Lt.

T. M. Reid (late Cadet Corpl., Edinburgh Univ. Contgt., Sen. Div., O.T.C.) to be Lt.

ROYAL AIR FORCE

The undermentioned are granted short service commissions as Flying Officers for three years on the active list: H. Bannerman, Ian MacKay, W. P. Stamm, H. S. Barber, and D. R. Crabb.

Flight Lt. H. W. Corner is promoted to the rank of Squadron Leader.

Flying Officer L. M. Corbet is promoted to the rank of Flight Lt.

Flight Lt. (Hon. Squadron Leader) H. E. H. Tracy relinquishes his temporary commission on completion of service and is permitted to retain the honorary rank of Squadron Leader.

INDIAN MEDICAL SERVICE

The undermentioned officers retire: Lt.-Cols. A. Kennedy and G. G. Hirst.

Capt. M. Chandra relinquishes his temp. commn.

PANEL AND CONTRACT PRACTICE

Antenatal Examination

THREE years ago the Winsford council, desiring to obtain antenatal records from general practitioners in their urban district, offered to pay 10*s.* 6*d.* a case for uninsured women, and the doctors agreed to report on insured women without an extra fee. The Cheshire county council adopted the scheme with one modification—namely, that the doctors should be paid only for women sent to them by a midwife. The local branch council of the B.M.A., whilst approving the scheme in general, decided that a report on insured women should not be given without payment of a proper fee, as it was outside the requirements of the Act. They were doubtful too as to the significance of the stipulation that the reference must be by a midwife. When the matter came before the recent meeting of the Insurance Acts Committee the question seems to have been seriously discussed whether an insurance practitioner ought to give antenatal service before the capitation fee was increased to cover this extra work. There can, however, be little doubt what would be the result of a medical service inquiry if a complaint were made by a pregnant woman that her doctor failed to look after her properly before confinement, whether or not he was proposing to attend it himself. This is obviously general practitioner service, but the report is not an obligation and he would be entitled to a fee for it. There is, however, more behind this than the question of fees or examination. The Winsford scheme is an attempt on the part of general practitioners to get back the antenatal treatment both of insured and uninsured women from the hands of the whole-time officers of maternity clinics. For this purpose the negotiators thought it worth while to make some concession about payment for reports in order to obtain the work now required by the local authority from its paid staff. As Dr. Dain remarked at the I.A.C. meeting, this work was hardly in existence when insurance practice began, whereas now everyone expected it. If, as was likely, about one-fifth of parturient mothers were insured persons there would be roughly 100,000 cases to divide among 15,000 insurance doctors. Antenatal work to be adequate demanded two examinations at specified and selected intervals. Whole-time officers doing this work for the local authority made reports, and if practitioners wanted to keep it in their hands they would have to make reports. This might be used as an argument for an increased capitation fee, if it was not open to the rejoinder that it was in nature preventive and would decrease puerperal morbidity, thus reducing medical attendance. The result, however, would be less work for the specialist rather than for the practitioners, attendance on a confinement not being paid for under the Act. The I.A.C. after full discussion passed unanimously the following resolution :—

> That the committee recognises that the position has arrived when antenatal examination and supervision is an essential service for the pregnant woman, that it is a service which can and should be rendered by general practitioners, and therefore it is a service to which insured women as such are entitled.

This resolution, it will be observed, says nothing about payment for reports. It would appear reasonable that where the local authority enters into agreement with the local profession to get this antenatal work done it should be willing to pay for the reports, as it would then be saved the necessity of paying whole-time medical officers to do the work. This system is apt to lead to friction between patient and doctor, when the latter is called to attend cases during or after parturition about which he has known nothing previously, or when a difficult case has been sent into hospital without the doctor's knowledge, and he is called in later to attend at home without having heard what difficulties were encountered in hospital.

The Cut

The I.A.C. considered whether the time had come to ask for the removal of the 10 per cent. deduction from insurance practice income. A deputation was appointed, consisting of Dr. Dain and five other members, together with the two medical secretaries, to interview Mr. Neville Chamberlain, in view of the fact that he was Minister of Health when the cut was imposed and had given assurance that restoration of the full fee would be favourably considered when the appropriate time came. It seems however that the Chancellor refused to see this deputation on the ground that the representation should be made to the present Minister of Health.

Inspection of Surgeries

The Middlesex insurance committee had issued an instruction to its allocation subcommittee to consider all new applications to open surgeries and to arrange for their inspection, in order to make certain that surgery and waiting-room accommodation were satisfactory. As Dr. Dain pointed out, it is not necessary to have a surgery or waiting-room at all to become an insurance practitioner. Any objection must be made subsequent to admission to the panel, the requirements being dependent upon the size of the doctor's list. Branch surgeries are in a different category and are definitely liable to inspection. It may be advantageous to the doctor to know early the kind of premises required of him, so as not to go too far with arrangements which would not satisfy the inspectors.

Local Defence Funds

A sum of £250,000 was aimed at by voluntary levy from panel committees for defence purposes, each committee being given its quota which it was expected to produce eventually. Many committees have now reached their allotted amount and some have passed it. The question was discussed at the annual conference what should be done by committees which have reached their quota, and it was generally felt that the levy should continue in order to encourage among the younger men a sense of responsibility for their own defence. The I.A.C., sitting as trustees of the National Defence Trust, had requested the Bucks committee to say what they were doing with the money they were still collecting. The reply was that they proposed in future to collect during three-quarters only of the year, and to use the money in giving subscriptions to Epsom College, to the Royal Medical Benevolent Fund, to meet the costs of group meetings, to make payment to doctors attending meetings, to make loans to practitioners in advance of quarterly payments, to offer payment to representatives of a deceased practitioner, and possibly payment in case of prolonged illness. In Derbyshire, after payment of administrative expenses, nearly £1000 remained in hand, and the committee had a yearly income of between £350–£400. Of this £100 was given annually to charities, the remainder being held on trust for benevolence to Derbyshire insurance

practitioners or their dependents. If any money was left it would go to help sons and daughters of local practitioners to take a medical or university training. Recently two scholarships of £50 had been granted.

Choice of Chemist

Mr. G. A. Mallinson, M.P.S., secretary of the National Pharmaceutical Union, writes: "With reference to the note headed 'Doctors and Chemists' on p. 216 of your last issue, your contributor has apparently overlooked the control exerted by Section 24 (5) of the National Health Insurance Act, 1924, in regard to this question of the doctor interfering with the free choice of a chemist by an insured person. The section reads as follows:—

'Every insurance committee shall make arrangements for the supply of proper and sufficient drugs and medicines and prescribed appliances to insured persons in accordance with the regulations, and the regulations made for the purposes of this subsection shall provide for the arrangements being made subject to the approval of the Minister and being such as to enable insured persons to obtain such drugs, medicines and appliances if ordered by the medical practitioner by whom the insured persons are attended from any persons with whom arrangements have been made.'

In my opinion this section provides free choice of chemist, and anybody who interferes with the insured person in his choice of chemist is altering the arrangements which have been made by the insurance committee, with the approval of the Minister, that the insured person is to obtain his medicines from *any* persons with whom arrangements have been made.

"It seems clear to me that the doctor who directs a patient to go to a particular chemist does interfere with those arrangements, and I suggest that just as doctors themselves value the right of free choice of doctor by insured persons, chemists also value and have a right to expect free choice of chemists by insured persons."

The section quoted by Mr. Mallinson says in brief that the arrangements made by insurance committees must be such that any insured person can obtain anything ordered by an insurance practitioner from any chemist under contract with his insurance committee. If a prescription comes in for oxygen the chemist must supply it; he cannot say "I don't sell oxygen." The section does not say the doctor must not tell the patient to go to chemist C. All it says is that the patient may go to C, D, E, or F if he likes, and each must be able to supply oxygen if the doctor has ordered it. It was not sought to defend the practice of a doctor selecting a chemist to make up his prescriptions—such a practice is not wise or desirable. But under existing regulations the doctor who does advise a patient to go to a particular chemist cannot be held guilty of a breach of the terms of service.

OBITUARY

LLEWELYN POWELL, M.B. Camb.

WE regret to record the death on Saturday last, Jan. 27th, of Dr. Llewelyn Powell, consulting anæsthetist to St. George's Hospital, London. The event occurred suddenly at his house in Duke-street, W., just as he was starting on a cruise for his health.

Llewelyn Powell was born in 1870, the seventh son of the late Mr. G. H. Powell, of Hampstead, and was educated at Eastbourne and Trinity College, Cambridge. He graduated in Arts in 1892, and completed his medical training at St. George's Hospital as M.B., B.Chir. in 1895. At his hospital he held the house appointments, becoming in 1900 medical registrar. In 1905, when the late Frederic Hewitt was elected physician-anæsthetist to St. George's under a special appointment, Powell became one of the anæsthetists and was closely associated with Hewitt in private practice. He was also anæsthetist at the National Hospital, Queen-square, the Samaritan Hospital, and at several other charities.

With these varied fields of experience Powell became one of the best known anæsthetists in London and the demand for his services in private practice was very large. He took little part in the debates at societies and had an infrequent pen, but an essay on the administration of anæsthetics in labour, which appeared in Latham and English's "System of Treatment," showed him as a clear and practical writer. One who knew him well says: "Powell's personality added to his skill in securing him the regard of patients. He was calm and kind. He did not attempt to make the patient think that either administering or receiving an anæsthetic could be regarded as a joke; but he did in a remarkable manner remove apprehension by his blend of seriousness and wit."

Dr. Powell married in 1901 Nina Marion, daughter of the late Mr. Rowland Hunt, of Boreatton, but was left a widower with a daughter in the following year. He never married again and made his home largely in the United University Club, where he was a highly regarded and extremely popular member.

A friend since College days, and a colleague writes: "Dr. Llewelyn Powell was an honorary anæsthetist to St. George's Hospital for little short of 30 years, and during that time there was no more popular or respected member of the staff. As an anæsthetist his distinction was sound judgment and constant care rather than enthusiastic attempts at novel methods or startling technique; consequently he was one of those with whom the operating surgeon always felt at his ease. In the social life of the hospital he was particularly prominent and in his younger years played a great part in the theatrical entertainments and in the concerts which were in those days provided annually for the nursing staff by their medical colleagues. As an amateur actor and humorous singer he was equally gifted. On the serious side of hospital life Powell was a man whom his fellows instinctively trusted. He was a colleague incapable of jealousy, or anything other than absolutely straightforward conduct. He had a buoyancy which bore him up under more than one stroke of cruel misfortune, and his sense of humour was expressed in witty tongue. Small wonder that Powell was loved; he will be sorely missed by a host of friends.

ANNIE JACKSON, M.D. Edin., L.M. Dub.

THE death was reported at the beginning of the year of Dr. Annie Jackson, which occurred suddenly on Dec. 30th last, in the seventy-first year of her age. She was in many respects a remarkable woman.

Born in 1864 at Oakenclough, a village near Garstang in Lancashire, she came of a Quaker family and did not resolve to enter the medical profession until she was 35 years of age. She then entered the school of medicine of Edinburgh University and

graduated M.B., Ch.B. in 1904. Later she took the diploma L.M.Dub. and obtained resident appointments at Leith Hospital and the Hospital for Women and Children, Edinburgh. In 1908 she began her career as a general practitioner in Derby, and until her death conducted a large private practice there; but it is, perhaps, particularly as an anæsthetist she will be best remembered. Shortly after coming to Derby, over a quarter of a century ago, she was appointed anæsthetist at the Derbyshire Women's Hospital, and throughout the long ensuing period she achieved remarkable success as an administrator. In 1915 she proceeded to the M.D. degree, and during the war years added to her reputation as an able, energetic, and devoted doctor. She was also a physician to the Home of Rest, Derby, a member of the committee of management of the Borough Mental Hospital, and an assiduous attendant at the meetings of the Derby Medical Society, on the council of which body she served. She was a member of the panel committee and had held divisional office in the B.M.A.

Dr. Jackson was contemplating retirement at the time of her death, and it is understood that some material memorial to her will be put in hand.

WILLIAM JAMES DOWLING, M.D. Dub.

WE regret to announce the death on Jan. 24th of Dr. W. J. Dowling, assistant tuberculosis officer at the City of London Hospital, Victoria Park. He was the second son of Thomas Dowling, district inspector of the Royal Irish Constabulary, and was educated at Rockwell College and Trinity College, Dublin, where he was an exhibitioner in modern languages and Nutting scholar. Immediately on qualifying in 1915 he joined the special reserve of the R.A.M.C., and was on active service in France throughout the rest of the war. He served with the 3rd Division and was stretcher-bearer captain to the 42nd field ambulance and 3rd Battalion machine gun corps. He was mentioned in despatches by Lord French, and subsequently awarded the Military Cross with bar. After the armistice he served in Germany with the army of occupation and represented the 3rd Division—acting as adjutant for a combatant corps, an unusual distinction for a non-combatant officer—in the march under the Arc de Triomphe in Paris. After the war Captain Dowling settled in practice in North London and later became medical officer to out-patients, and then assistant tuberculosis officer, at Victoria Park Hospital.

A colleague writes: "The news of Dr. Dowling's death leaves me with a deep sense of personal loss. He was such a capable, loyal comrade, whose quiet friendliness made it a happy privilege to work with him. I shall always remember his understanding and sympathetic way with his patients, which was just an expression of his warm-heartedness."

Dr. Dowling died in the hospital of pneumonia. He was 41 years of age.

MARJORIE MAISIE DUGGAN, B.Sc., M.B. Wales

Dr. M. M. Duggan, who died on Jan. 8th, was the daughter of Mr. John Duggan of Builth Wells. She took her medical course at the University College of South Wales and Monmouthshire and the Welsh National School of Medicine, graduating B.Sc. in 1924 and M.B., B.Ch. Wales in 1926. She was then made demonstrator in the department of pathology of the school, a post which she held until 1931, when she joined the department of biochemistry at the University of Alberta Medical School, Canada. She returned in 1932, and was appointed assistant bacteriologist to the Welsh National Memorial Association, a post which she retained after her marriage in June, 1933, to Mr. A. Speirs. Dr. Duggan was a keen worker, conscientious and efficient. Before specialising in bacteriology she had acquired a considerable experience of all branches of pathology, and the Welsh National Memorial Association profited by the broad outlook which she brought to its special bacteriological problems.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Reassembly after Christmas

BOTH Houses of Parliament reassembled on Monday, Jan. 29th, after the Christmas recess. The business in the House of Lords was formal and their lordships adjourned until Feb. 6th.

The Contraceptives Bill

ON Dec. 20th Lord DAWSON introduced in the House of Lords a Bill to restrict the sale, display, and advertisement of contraceptives, which was read a first time. The Bill proposes to make it unlawful:

(*a*) To sell or offer for sale in any street or public place, or by means of an automatic machine so placed that it can be used by persons in any street or public place, any contraceptive.

(*b*) To go to the premises of any person and there sell or offer for sale any contraceptive, unless the sale or offer is made in pursuance of a previous request of that person, or the premises are used by a dealer in contraceptives, who buys to sell again.

(*c*) To display in or outside any shop, so as to be visible to persons outside the shop, any contraceptive or any box, bottle or wrapper containing or purporting to contain any contraceptive, or to display in, on or outside any shop, so as to be visible as aforesaid, any picture or written description of any contraceptive.

(*d*) To send or deliver or cause to be sent or delivered to any unmarried person who has not attained the age of eighteen years (for the purpose of any trade or business), any circular, advertisement or other document containing information of any kind whatsoever relating to any contraceptive.

Contravention of any provision will render a person liable on summary conviction, in the case of a first offence, to a fine not exceeding £20, in the case of a second offence, to a fine not exceeding £50, and, in the case of any subsequent offence, to a fine not exceeding £50 or to imprisonment for a term not exceeding three months, or to both. But it shall be a defence under (*d*) that there were reasonable grounds for believing that the recipient had attained the age of 18 years or was married.

"Contraceptive" is defined as any appliance, instrument, drug, preparation or thing, intended to be used to prevent pregnancy resulting from sexual intercourse between human beings.

"Public place" includes any public park, garden, sea beach, pier, market, fair or railway station, and any ground to which the public for the time being have or are permitted to have access, whether on payment or otherwise.

"Shop" includes any premises where any retail trade or business is carried on.

"Street" includes any highway and any public bridge, road, lane, footway, square, court, alley or passage, whether a thoroughfare or not, and includes any doorway or open porch adjoining any street.

The Bill, if passed, will be cited as the Contraceptives Act, 1934. It would not extend to Northern Ireland.

HOUSE OF COMMONS

MONDAY, JAN. 29TH

Slum Clearance

Mr. STOURTON asked the Minister of Health the total number of houses to be demolished under the five-year plan; and if all local authorities approached by the Ministry had now submitted satisfactory schemes.

Mr. HICKS asked the Minister of Health whether he had any information to give the House on the position of slum clearance.—Mr. SHAKESPEARE (Parliamentary Secretary to the Ministry of Health) replied: The programmes received contemplate the demolition and replacement of 224,515 houses containing over one million persons. There are in all, 1716 authorities, of which 591 are rural: 1604 have made returns; of these 1257 have been accepted. The remaining 347, together with the 112 who have not yet made a return, are under investigation and discussion with the authorities concerned.

As regards actual progress, during the year 1933 orders were confirmed under the 1930 Act providing for the demolition of 10,313 houses, while approvals were given for building 15,667 new houses under the Act. The corresponding figures for the whole period between the passing of the Act and the end of 1932 were 6449 and 9902 respectively.

Mr. DENMAN asked the Minister of Health whether he was now prepared to encourage local authorities which had made adequate progress with their slum-clearance schemes to build unsubsidised houses in cases where the needs were not being met from other sources.—Mr. SHAKESPEARE replied: Yes, Sir. Local authorities desiring to build unsubsidised houses in the circumstances indicated are encouraged to do so. On this matter I would further refer my hon. friend to my right hon. friend's statement in the debate on the address.

Poor Relief in Scotland

Mr. NEIL MACLEAN asked the Secretary of State for Scotland the number of persons in Scotland in receipt of able-bodied poor relief, and the number of their dependants, on the last available date, and comparable figures for the same period in the previous year.—Mr. SKELTON (Under-Secretary of State for Scotland), in reply, stated that the number of able-bodied persons in Scotland in receipt of poor relief at Dec. 15th, 1933, and Dec. 15th, 1932, was as follows:—

	Dec. 15th, 1933.	Dec. 15th, 1932.
Males	43,245	34,802
Females	5,954	4,856
Dependent wives ..	24,275	19,981
Dependent children ..	55,940	47,907
Totals ..	129,414	107,546

Mr. NEIL MACLEAN asked the Secretary of State for Scotland the number of persons in Scotland in receipt of poor-law relief on the last available date, giving separately the figures for men, women, and children, and comparable figures for the same period last year.—Mr. SKELTON, in reply, stated that the number of poor persons in Scotland in receipt of poor relief (including relief to the able-bodied poor) at Dec. 15th, 1933, and Dec. 15th, 1932, was as follows:—

	Dec. 15th, 1933.	Dec. 15th, 1932.
Males	91,227*	79,420*
Females	51,685*	48,861*
Dependent wives ..	45,497	38,786
Dependent children ..	119,753	106,701
Totals ..	308,162	273,768

* These figures include children who are not dependants, but are in receipt of poor relief in their own right. The precise numbers of such children cannot be separately stated.

Government and Licensing Reform

Mr. RHYS DAVIES asked the Home Secretary whether the Government would introduce legislation at an early date to give effect to the report of the Royal Commission on Licensing.—Sir J. GILMOUR replied: It will not be possible for the Government to undertake any such legislation during the present session.

Workmen's Compensation

Mr. TOM SMITH asked the Home Secretary whether it was proposed to introduce any measure this session to deal with the question of workmen's compensation.—Sir J. GILMOUR replied: I regret I cannot promise to introduce any legislation on the subject this session.

Protection against Road Accidents—New Legislation

Mr. ANSTRUTHER-GRAY asked the Minister of Transport what steps he was taking to reduce the number of road accidents.—Mr. GRAHAM WHITE asked the Minister of Transport what steps he proposed to take to reduce the perils of the roads.—Mr. OLIVER STANLEY replied: The Government is deeply concerned at the grave position shown by the recently published returns of road accidents during 1933 and has decided to introduce legislation to deal with the subject at an early date. Apart from any legislation proposed, I have considered further steps which can be taken by regulation, or by other administrative action. I also desire to bring home to the public during the next few months the nature of the loss caused by road accidents, and the extent to which they can be prevented by the exercise of reasonable care and consideration for others on the part of all users of the highway. I shall in due course appeal to the Press, the B.B.C., and the film industry for their coöperation and assistance. I have also made a contribution from the Road Fund towards the cost of a special campaign for the promotion of road safety, which the National Safety-First Association have projected for the spring and summer of the present year, and which in the main will be directed towards a development and extension of their local activities in the more important centres of population throughout the country. I look with confidence to the coöperation and assistance of local authorities and other public bodies, as well as the motoring organisations and associations of motor manufacturers, in this concerted effort to reduce the perils at present attending the use of the public roads.

Health Insurance (Additional Benefits)

Mr. RHYS DAVIES asked the Minister of Health (1) in connexion with the administration of additional benefit under the provisions of S.R. and O., No. 1061 (1930), he would give the names of approved societies who had been or were now within these regulations providing additional benefits in cash or treatment to members joining or transferring to such societies where the members had not fulfilled the qualifying conditions for membership contained in Article 11 (*a*), (*b*), and (*c*) of these regulations, and similar information respecting societies providing such benefits from funds donated by the parent bodies of such societies; (2) if he would give the names of approved societies which had been allowed under Article 28 of the appropriate regulations to transfer sums for purposes under headings (*a*), (*b*), and (*c*) of those regulations, and the amounts per member per annum spent by such societies since 1930 for the purposes of subsection (1) (*b*) of Section 75 of the principal Act, and additional benefit No. 5, respectively; and (3) if he would give the names of approved societies which had been allowed to exceed the maximum of 2*d*. per member under Article 30 of the appropriate regulations for the purposes of subsection 1 (*b*) of Section 75 of the principal Act, or 3*d*. per member for the purposes of additional benefit No. 5, want or distress.—Sir HILTON YOUNG replied: So far as I am aware no society has provided additional benefits to persons not entitled to such benefits under the Additional Benefit Regulations, though several societies have taken advantage of their powers under Section 75 (1B) of the National Health Insurance Act, 1924, to make eleemosynary payments to charitable institutions which may in some cases provide treatment similar in character to that obtainable by way of additional benefit. I am not aware of any case in which grants have been made by the parent bodies of approved societies in order to secure treatment for the members of those societies. The power under Article 28 of the

regulations to transfer sums not required for any particular additional benefit to augment the amount available for another additional benefit has been freely exercised by societies, the number of such transactions running into many thousands. 450 societies in England have allocated sums amounting in the aggregate to approximately £14,000 a year towards making payments to charitable institutions in accordance with Section 75 (1B) and the corresponding figures for additional benefit No. 5 are approximately 800 societies and £36,000 a year. No society has been allowed to exceed the prescribed maximum of 2d. per member per annum for payments under Section 75 (1B). No maximum is laid down for allocations to additional benefit No. 5.

Housing in Stepney

Dr. O'DONOVAN asked the Minister of Health if his housing officers were in regular consultation with the local authorities responsible for housing in Stepney; and if he could make a statement on the efforts being made now, and on those now being planned.—Sir HILTON YOUNG replied: The reply to the first part of the question is in the affirmative. The borough council are clearing two areas containing 315 houses and providing new accommodation for 1963 persons with assistance under the Housing Act, 1923. They are purchasing, under the Act of 1930, an area containing 72 houses and are about to commence rehousing work on this area. The provision of rehousing accommodation on two further sites is under consideration. Twenty-three dwellings provided under the Housing (Financial Provisions) Act, 1924, are approaching completion. The London County Council are clearing two areas in the borough containing 682 houses, with assistance under the Act of 1923, and providing new accommodation for 4306 persons. They are arranging with a public utility society for the rehousing of the occupants of an area to be cleared which contains 45 houses. Orders made by the County Council for the purchase of two areas containing 41 houses, have been the subject of proceedings in the courts which terminated successfully for the Council on Thursday last. The purchase of further sites for rehousing is under consideration.

TUESDAY, JAN. 30TH

Insurance against Third-party Risk

Mr. TOM SMITH asked the Home Secretary the number of convictions for failure to insure against third-party risk for the past 12 months.—Sir J. GILMOUR replied: Preliminary figures which have been obtained show that during 1933 there were 12,479 convictions in England and Wales on charges of failing to insure against third-party risks.

PUBLIC HEALTH

TRAINING, RECRUITMENT, AND PROMOTION IN THE PUBLIC HEALTH SERVICE

IT is a matter of common knowledge that there is dissatisfaction in the public health service with the manner in which appointments of all grades are made, and more especially with the methods of selection for senior posts. Its members will, therefore, welcome the recommendations of the report of a Departmental Committee [1] just issued, especially those which lay stress upon the evils of nepotism and the undesirability of canvassing, although the committee is discreetly vague as to the means of abolishing this latter objectionable practice. For junior appointments of a technical nature and requiring a specific qualification, the present practice of appointment by the responsible committee is not open to a great deal of criticism, provided that local and personal influence can be eliminated. Such a committee is, or ought to be, guided by the administrative head of the department, whose interest lies in the efficiency and harmonious working of the organism which he manages. When it comes to the appointment of a chief official requiring not only high technical qualifications and administrative capacity, but a professional record and qualities of personality which will ensure that he will be acceptable to the members of his own profession, such a committee is not well equipped for the purpose. There is ample evidence that members of councils realise their deficiency. Being without the necessary knowledge and standards, they tend to play for safety by promoting members of their own staffs whom they know to be agreeable, conscientious, and without blemishes of character or faults of habit, although they are not necessarily the best people available for the post. Indeed, with the growth of departments and the consequent presence on their staffs of qualified assistants, this practice of promotion has become so common that men are tending to settle down and wait for the vacant shoe instead of seeking that variety of experience which the Departmental Committee would like them to have; and when a council departs from this policy and brings in an outsider whom it considers to be better equipped for the responsible post, there is a sense of grievance which is almost justified because its action appears to be a reflection upon the competence of its own staff.

The Departmental Committee proposes to improve the machinery for making appointments generally, and for handling many other matters affecting council staffs, by setting up a special committee of the council, which it calls an establishment committee. Senior officers would be appointed by a small group composed of members of this and the employing committee. No doubt, where such an arrangement does not already exist its adoption would lead to improvement, but it does not get over the absence of any real qualification on the part of the members of either committee to estimate the worth of candidates for senior posts requiring high professional or technical attainment. The committee might well have taken evidence as to the working of the Local Appointments Commission which appears to have been remarkably successful in raising the level of local government service in the Irish Free State. Perhaps it is with some such ultimate end in view that the committee has made its chief recommendation the establishment of a central advisory committee for the guidance of local authorities, in the first place, as to methods of training and recruitment, and, secondly, to go into many questions raised in the report.

The committee had before it evidence from certain witnesses that the reservation of chief appointments to technically qualified officers was detrimental to efficiency, and it appears to have given the matter careful consideration. Perhaps its attitude is best revealed by quotation:—

> "On the whole we are not prepared to say at present that any radical change in the existing system of appointing technically qualified officers to principal positions . . . is desirable or practicable. We suggest, however, that the larger local authorities should not always take it for granted that the principal officers must necessarily be technically qualified (except, of course, where the qualification is required by law) or that officers well qualified technically are equally capable in administration."

A medical officer must, of course, be medically

[1] Report by the Departmental Committee on Qualifications, Recruitment, Training, and Promotion of Local Government Officers. London: H.M. Stationery Office. 1934. Pp. 91. 1s. 6d.

qualified and, virtually in all cases, he must also hold a further special qualification in public health, and yet the committee has chosen just this type of appointment to illustrate the defect of the system in which it is "not at present" prepared to recommend a radical change. It appears to accept as axiomatic that administrative ability is more important than a medical qualification for a great part of the work. The fact that all public health work is based on medical ideas and principles is not sufficiently stressed. Nor are we told what this administrative ability really is. If it means the capacity to apply scientific ideas to the practical routine work of alleviating the sufferings of mankind and to supervise and guide those who help him in doing so, is there any reason to suppose that a medical man is less capable than any other? If it means a knowledge of clerical methods, systems of filing, and so on, it is true that in such matters a medical man cannot claim expert knowledge, but it is the function of the head of a department to demand such things, not to devise them. If it means the ability to put his requirements clearly and succinctly before committees consisting of members without technical knowledge, is there any one better qualified to do so than a medical man, who knows how medical opinion is advancing and yet how new ideas must be sifted and established before they are applied in the form of concrete schemes? In fact, a medical officer of health almost always serves, from the date of qualification, a long apprenticeship in hospitals and health departments where he is a part of an organisation held together by administrative measures. If his training is not a good one for administration, it is difficult to understand why the committee advocates the introduction of university graduates into the local government service—which, incidentally, we welcome—since it is just the mental attitude acquired by graduates that the liberal education of medicine has engendered in our profession.

The real danger is that a medical officer of health may become too much engrossed in administration and so lose touch with medical thought. There is, therefore, much to be said for the committee's proposal that senior, but definitely subordinate, lay administrative officers should be appointed with responsibility for the secretarial work and the supervision of expenditure. In effect, this arrangement holds already in every large department, although the nature of the responsibilities is seldom recognised by the payment of a commensurate salary. But it would be a retrograde step if these officers acquired such a status that lay committees would look to them for guidance as to policy in matters affecting the preservation and promotion of the public health.

From the Kentish Hopfields

Last autumn we set out in this column some of the difficulties to public health authorities occasioned by 60,000 persons visiting the Kentish hopfields from London and bringing into a new environment the opportunities of infection and cross-infection. It was then noted that the Metropolitan Asylums Board in its day had felt unable to accept responsibility for the hospital treatment of infectious disease which arose in Kent, and, when the London county council took over the responsibilities of the M.A.B., the Kent county council was informed that the same policy would continue although the L.C.C. would, as far as they were able, take suitable infectious cases in the London fever hospitals if the Kentish authorities would pay their whole cost. This offer, we are told, was not accepted; but in a report presented to the L.C.C. on Tuesday last from its central public health committee, it is stated that two persons suffering from diphtheria were transferred from Kent to their home in St. Marylebone, one by ambulance and one by train, apparently with a view to their care becoming a matter for the L.C.C. The M.O.H. for St. Marylebone was, it seems, under the impression that this course followed some arrangement between the county medical officers for Kent and London. There was, however, in the committee's view no foundation for the suggestion that the L.C.C. was party to any such arrangement, and in the opinion of the committee the situation which has arisen is serious, for the transportation of patients from Kent to their homes in London and thence to hospital would cause delay in treatment which might be injurious to their health and would be accompanied by risk to the public health if they travelled in public conveyances. The committee is advised that a remedy might be found in Section 130 of the Public Health Act, 1875, under which the Minister of Health may make regulations with a view to the treatment of persons suffering from infectious disease and the prevention of its spread. The committee therefore recommended to the L.C.C. that the Minister of Health should be asked to consider the issue of regulations under this section to provide that the obligations of the local authority for the treatment of persons temporarily resident within their district, who are there found to be suffering from infectious disease, should be the same as for the treatment of persons who are inhabitants of the district.

Vital Statistics for 1933

Last week the Registrar-General issued for the information of medical officers of health a provisional statement of the figures for birth-rate, death-rate, and infant mortality during the year 1933. As the figures for London were corrected after we went to press we repeat the whole table now as it should stand.

—	Birth-rate.	Death-rate.	Infant mortality-rate.
England and Wales..	14·4	12·3	64
118 county boroughs and great towns including London ..	14·4	12·2	67
131 smaller towns ..	14·3	10·9	56
London (administrative county)	13·1	12·3	59

The smaller towns are those with estimated resident populations of 25,000–50,000 at the 1931 census. The birth- and death-rates for England and Wales as a whole are calculated on the estimated mid-1933 population, the remaining rates on the estimated mid-1932 population.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 20TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 7 (last week 13); scarlet fever, 3681; diphtheria, 1529; enteric fever, 18; acute pneumonia (primary or influenzal), 1524; puerperal fever, 50; puerperal pyrexia, 120; cerebro-spinal fever, 29; acute poliomyelitis, 2; encephalitis lethargica, 8; dysentery, 14; ophthalmia neonatorum, 92. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Jan. 23rd–24th was as follows: Small-pox, 21 under treatment, 0 under observation (last week

20 and 2 respectively); scarlet fever, 2392; diphtheria, 2100; enteric fever, 7; measles, 1059; whooping-cough, 252; puerperal fever, 28 mothers (plus 16 babies); encephalitis lethargica, 260; poliomyelitis, 5; "other diseases," 211. At St. Margaret's Hospital there were 20 babies (plus 9 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox or enteric fever, 60 (15) from measles, 10 (1) from scarlet fever, 29 (7) from whooping-cough, 49 (6) from diphtheria, 37 (8) from diarrhœa and enteritis under two years, and 87 (15) from influenza. The figures in parentheses are those for London itself.

The deaths from influenza during the past few weeks (working backwards) have been as follows: 87, 100, 109, 83, 97, 95, 70, 59. The 296 deaths during the first three weeks of the year compare with 3300 deaths for the corresponding weeks of 1933. Six deaths were this week attributed to influenza at Liverpool and at Birmingham, 3 each at East Ham, Sheffield, and Stoke-on-Trent; no more than 2 in any other great town. Seven fatal cases of measles occurred at Manchester, 6 at Liverpool, 5 at Leeds, 3 at St. Helens. Liverpool reported 4 deaths from whooping-cough, Leeds 3. Of the fatal cases of diphtheria 6 occurred at Liverpool, 4 at Merthyr Tydfil, 3 at Birkenhead.

The number of stillbirths notified during the week was 266 (corresponding to a rate of 41 per 1000 total births), including 50 in London.

MEDICAL NEWS

University of Oxford

In a congregation held on Jan. 18th the degrees of B.M., B.Ch. were conferred upon J. A. Boycott.

In the absence of Sir Charles Sherrington, Waynflete professor of physiology, on the grounds of ill-health, Dr. J. G. Priestley will act as his deputy during the Hilary term.

Radcliffe Travelling Fellowship.—An examination for this fellowship, which is of an annual value of £300 and tenable for two years, will be held during the Hilary term, beginning on Feb. 13th. Candidates must be bachelors of medicine of the University of not more than four years' standing, and the successful candidate will be expected to travel abroad with a view to studying medical science. Applications should be sent to the regius professor of medicine, University Museum, Oxford, not later than Feb. 8th.

Philip Walker Studentship in Pathology.—An election to this studentship will take place in the first week of June. Candidates should send letters of applications and copies of testimonials to the registrar of the University.

George Herbert Hunt Travelling Scholarship.—The next election for this scholarship, which is open to bachelors of medicine of the University of not more than five years' standing, will be made on April 9th. Candidates should be willing to travel abroad for at least three months for the purpose of clinical study or research in medicine. Applications should reach the dean of the medical school at the University Museum not later than Feb. 28th.

Rolleston Memorial Prize.—The next award will be made in Trinity term, the prize being offered for original research in animal and vegetable morphology, physiology and pathology, and anthropology. Candidates should submit a memoir of their work, with particulars of how it was carried out, to the registrar of the University before March 31st.

The Radcliffe Prize will be awarded again in 1935. It is given for research in human anatomy, physiology, pharmacology, pathology, medicine, surgery, obstetrics, gynæcology, forensic medicine, or hygiene. All bachelors of arts of not more than 12 years' standing who have proceeded or are proceeding to a medical degree in the University are eligible.

University of Cambridge

On Jan. 26th the following degrees were conferred:—

M.B. and B.Chir.—G. W. Hall-Smith, N. M. James, and John Parkes.

M.B.—E. W. Price and A. H. Charles.

B.Chir.—T. M. Bell (by proxy), J. S. Mitchell, W. E. Wells, S. M. Thompson, Frank Clifton, and R. H. Young.

University of London

Dr. George Payling Wright, assistant lecturer in morbid anatomy at University College Hospital medical school and pathologist to the hospital, has been appointed to the Sir William Dunn chair of pathology tenable at Guy's Hospital medical school.

Dr. Wright, who is 35 years of age, received his medical education at University College Hospital medical school and Oxford, where he graduated in medicine in 1924. In 1923 he became the Theodore Williams scholar in pathology and was awarded the Filliter exhibition in pathology at University College Hospital medical school; in the following year he became MacGregor scholar in histology at the College. In 1925 he held a Rockefeller travelling scholarship and did research work at Washington University, St. Louis. From 1926 to 1928 he was Graham scholar in pathology in London University and taught at University College Hospital. In 1928 he returned to America for three years as research fellow at Harvard medical school and tutor in Harvard University. He took up his present post in 1931.

The title of university reader has been conferred on Dr. Joan Ross, senior assistant pathologist and lecturer in pathology at the Royal Free Hospital.

The senate have as a temporary measure recognised the new British Post-graduate Medical School as a school of the University for two years. It is expected that it will be open to students in October.

Royal College of Physicians of London

At a quarterly meeting of the College held on Jan. 25th, Lord Dawson, the president, reported the gift to the library of engraved portraits of medical men by Dr. Arnold Chaplin, and announced the award of the Swiney prize for 1934 to Sir William Searle Holdsworth, Vinerian professor of English Law in the University of Oxford.

Dr. G. F. Buchan was appointed representative of the College at the congress of the Royal Sanitary Institute to be held at Bristol in July, and Dr. R. R. Trail as representative at the annual conference of the National Association for the Prevention of Tuberculosis in June.

A donation of 100 guineas was voted to the fund for the purchase of the Codex Sinaiticus.

The following candidates having satisfied the censors' board were admitted to the membership:—

Jamshed Nasarvanji Bhada, M.B. Lond.; Edward James Boome, M.B. Birm.; Wilfrid Ingram Card, M.D. Lond.; George Miller Clough, M.B. Sydney; Charles Richard Croft, M.D. Oxf.; Amalananda Das, M.B. Calcutta; Charles Allan Gavan Duffy, M.D. Melb.; George Ronald Ellis, M.D. Camb.; Frank Scott Fowweather, M.D. Liverp.; Paul Ghalioungui, M.D. Cairo; Thomas Moore Greenaway, M.B. Sydney; Charles Herbert Stuart Harris, M.D. Lond.; Elchon Hinden, M.B. Camb.; William Hughes, M.B., N.U.I.; John Henderson Hunt, M.B. Oxf.; Renatus Kempthorne, L.R.C.P.; Robert Knox, M.B. Lond.; Malcolm Henry MacKeith, M.D. Oxf.; John Parkes, L.R.C.P.; Robert Hughes Parry, M.D. Lond.; Douglas Gordon Radcliffe, M.B. Sydney; Max Leonard Rosenheim, M.B. Camb.; Christopher Bagot Sangster, M.B. Adelaide; Arthur Maurice Stewart-Wallace, M.B. Lond.; and Matthew Westwood, L.R.C.P.

Licences to practise were conferred on 150 candidates (130 men and 20 women) who have passed the final examination of the Conjoint Board and have complied with the by-laws. The following are the names and medical schools of the successful candidates:—

S. B. Adams, Bristol; S. H. Alavi, St. Thomas's; S. R. Ali, Bombay and King's Coll.; N. Asbell, Westminster; H. H. Atkinson, Univ. Coll.; J. S. Bailey, Camb. and St. Bart.'s; Louie M. M. Beadnell, Univ. Coll.; T. M. Bell, Camb. and Charing Cross; R. H. R. Belsey, St. Thomas's; R. L. Benison, Camb. and St. Bart.'s; T. A. Best, St. Thomas's; I. S. Bhalla, Punjab and Univ. Coll.; Mary A. M. Bigby, Royal Free; E. W. Bintcliffe, St. Bart.'s; E. A. Bisson, London; C. J. F. Blumenthal, Guy's; W. A. Bowdler, St. Thomas's; J. C. Buckley, Camb. and St. Thomas's; P. G. Burgess, Oxford and Manchester; W. A. Cannell, Charing Cross; F. F. Cartwright, King's Coll.; T. Chandrasekharan, Madras; A. S. Cheong, Singapore and St. Mary's; M. M. D. Chughtai, Punjab and Univ. Coll.; K. H. Clark, St. Mary's; C. W. J. Claydon, King's Coll.; L. A. Collins, Camb. and Charing Cross; H. V. Corbett, Liverpool; Beryl D. Corner, Royal Free; Margaret C. Cox, Cardiff; C. S. V. Daniels, St. George's; E. A. Danino, St. Bart.'s; D. R. Davies and Enid S. Davies, Univ. Coll.; L. W. Davies and W. A. Dawes, St. Thomas's; W. J. B. De Gruchy, Camb. and St. Thomas's; C. J. D'Monte, Middlesex; D. P. Dewe, Bristol and St. Mary's; C. B. Dharmasena, Ceylon and St. Bart.'s; T. H. Dias, Ceylon and King's Coll.; W. L. Dove, Liverpool; Katharine E. M. Dunne, Camb. and Leeds; E. Dunsby, Leeds; R. M. Ealand, Bristol; D. G. F. Edward, St. Bart.'s; E. H. Evison, Manchester; R. M. Farrington, Cardiff; Constance E. Field, Univ. Coll.; W. T. J. Fowler, Guy's; H. E. D. Gale, St. Bart.'s; J. F. Galloway, Liverpool; C. J. Gavey, London; C. A. George, St. Bart.'s; S. S. B. Gilder, London; T. D. M. Gillies, St. Thomas's; J. G. A. Gilruth, Camb. and Univ. Coll.; C. L. Greening, Durham; I. H. Griffiths, Middlesex; R. M. Haines, Westminster; S. Hales, Paris and Middlesex; H. C. A. Harris, Camb. and St. Thomas's; P. L. S. Hatton, St. Bart.'s; F. S. M. Heggs, St. Thomas's; R. Hill, Camb. and London; G. T. Hindley, Camb. and St. Bart.'s; A. V. House, Bristol; T. E. Howell and N. M. Jacoby, Guy's; Elizabeth M. James, Royal Free and West London; G. H. James, Birmingham; Joyce B. Jewson, Royal Free; R. W. John, Cardiff; D. J. Johnson, Camb. and St. Bart.'s; E. G. Jones and F. A. Jones, St. Bart.'s; H. W. E. Jones, St. Thomas's; I. R. Jones, Cardiff; J. G. Jones, King's Coll.; L. E. Jones, St. Thomas's; N. K. Kai, Univ. Coll.; Alice M. Kenny, Punjab and West London; W. L. Kerr and G. A.

Kiloh, King's Coll.; J. T. H. Knight, London; Mildred G. Latham, Royal Free; Gwladys R. Llewelyn, Bristol; Phyllis S. Lockie, Univ. Coll.; L. Lurie, London; J. B. H. McArthur, J. M. McArthur, and J. W. Mansie, Guy's; R. Mascarenhas, Calcutta and Guy's; W. N. M. Mason, Liverpool; L. H. Mattison, Manchester; E. A. Mayston, Guy's; Barbara G. Morton, Royal Free; R. B. Morton, St. Thomas's; G. A. Myers, Otago; R. V. N. Nayudu, Tanjore and London; Doris E. Oxford, Royal Free; R. S. Pachnanda, Punjab and King's Coll.; B. J. Philbin, Manchester; J. Phillips, Univ. Coll.; J. W. Piper, Guy's; A. H. Pirie and J. D. Powell, Camb. and St. Bart.'s; Margaret H. Prentice, Manchester; W. L. Price, Birmingham; H. S. Rassim, St. Bart.'s; T. R. F. Raw, Guy's; S. A. Razvi, Bombay and Birmingham; D. C. Reavell, St. Bart.'s; C. Reburn, St. Mary's; G. W. D. Reeves and J. W. Rhys, Guy's; J. D. Richardson, King's Coll.; S. A. W. Rushbrooke, Guy's; R. T. Rushton, Leeds; M. F. P. Ryan, King's Coll.; N. S. Sablin, St. Bart.'s; H. S. K. Sainsbury, London; C. A. J. Sampson, St. Thomas's; P. H. Sandifer, Middlesex; B. J. Sanger, London; D. J. Sheehan, St. Bart.'s; E. Shipman, Univ. Coll.; A. Smith, Leeds; M. C. L. Smith, St. Bart.'s; O. C. Smith, Univ. Coll.; L. Sobiya, Guy's; A. B. Stenhouse, Oxford and St. Thomas's; K. F. Stephens, St. Bart.'s; D. L. M. Stewart, King's Coll.; A. A. J. Stolow, Charing Cross; S. Sunkavally, Madras and London; R. J. C. Sutton, St. Bart.'s; K. R. Tattersall and S. J. L. Taylor, St. Thomas's; R. E. Thomas, Univ. Coll.; M. Tin, Burma and Guy's; Beryl Twyman, Univ. Coll.; G. R. Usmar, Sheffield and St. Bart.'s; R. S. Vine, Guy's; Winifred J. Wadge, Univ. Coll.; S. H. Wass, Guy's; D. Whittaker, Camb. and St. Thomas's; M. E. Wigfield, St. Thomas's; Brenda Winterton and Sylvia V. F. Wolfe, Royal Free.

Diplomas were conferred jointly with the Royal College of Surgeons upon the following candidates:—

Diploma in Public Health.—S. S. Alam, S. S. Banker, D. G. Evans, W. H. Green, Rachel Halperin, A. N. Haworth, Victoria H. King, W. E. B. Lloyd, E. M. Lourie, G. P. McCarthy, J. G. Morgan, V. Nadarajah, R. C. F. Smith, T. H. Stephens, and B. B. Wable.

The names of those granted diplomas in medical radiology, psychological medicine, and laryngology and otology were given on page 164 of our issue of Jan. 20th.

On Feb. 27th and March 1st the Milroy lectures will be delivered by Sir George Buchanan on International Coöperation in Public Health, its achievements and prospects; on March 6th, 8th, and 13th the Goulstonian lectures by Prof. E. C. Dodds on Hormones and their Chemical Relations; and on March 15th and 20th the Lumleian lectures by Dr. H. L. Tidy on Glandular Fever and Infective Mononucleosis. All these lectures will be given at the College at 5 P.M.

Scottish Conjoint Board

As a result of recent examinations of the Royal Colleges of Physicians and Surgeons of Edinburgh and the Royal Faculty of Physicians and Surgeons of Glasgow, the following candidates have been granted the diplomas of L.R.C.P. Edin., L.R.C.S. Edin., L.R.F.P. & S. Glasg.:—

Kate S. E. Muschamp, A. S. Russek, N. W. Nisbet, A. A. Crook, A. J. V. Klein, Lasar Krom, T. W. F. Gemmell, Rajathurai Ratnam, J. M. Dyce, A. S. Salama, J. W. D. Ferdinand, H. E. Schoen, A. B. Kabnick, Dorien Levine, J. A. Ratnayake, A. D. Macdonald, A. W. F. Catto, A. M. Chatelier, G. H. Taylor, Sydney Bedford, Mary R. McQuillan, Harry Bogart, Jacob Weinberger, Vidya S. Trivedi, I. C. Oestreicher, A. B. Johnson, and M. J. Lowther.

Harveian Society

The council of this society have selected Nutritional Factors in Disease as the subject of the essay for the next award of the Buckston Browne prize. The prize is open to any member of the medical profession registered in the British Isles or Dominions who is not over 45 years of age. The essays should be submitted by Nov. 1st, 1935. Further particulars may be had from Mr. C. P. G. Wakeley, 24, Queen Anne-street, London, W.1.

Central Association for Mental Welfare

A course on mental deficiency will be held at the University of London from April 16th to 28th. It is intended particularly for medical practitioners definitely concerned with the care of subnormal or abnormal persons. The course is divided into two parts, and Part I. (April 16th–21st) may be taken separately if desired; Part II. (April 23rd–28th) which deals with retarded and difficult children may only be taken separately by those who have in previous years attended Part I. or who have specialised experience. Clinical work will be arranged for each afternoon. Further particulars may be had from Miss Evelyn Fox, at the University Extension Department, University of London, South Kensington, S.W. 7, to whom applications should be sent before March 26th.

Royal Berkshire Hospital, Reading

The town of Wokingham has raised £1000 for the endowment of a bed in this hospital.

An Edinburgh Nursing Home

St. Raphael's Nursing Home, Edinburgh, is to be enlarged by the addition, at a cost of £15,000, of a new wing to accommodate 25 patients.

The late Mr. Philip Glynn

A child's cot in the orthopædic department of Leeds General Infirmary has been endowed in memory of Philip Edward Glynn, F.R.C.S., who was resident orthopædic officer at the infirmary when he died last September at the age of 27. Mr. Glynn's parents and sisters wish to express their gratitude to his friends, colleagues, and patients at Leeds and elsewhere, who have joined them in this memorial. The cot was dedicated by the Rev. P. D. Robbins on Jan. 12th.

Medical Tour in Provence

The faculty of medicine at Marseilles are again organising a tour in Provence and the Côte d'Azur for Easter week. Aix and Hyères will be among the places visited, and Easter Sunday will be spent at Cannes. Further particulars may be had from the Société Médicale du Littoral, 24 rue Verdi, Nice.

Disorders of the Voice

A course of lectures on this subject will be held from April 16th–21st at the Hôpital Bellan, 7 rue du Texel, Paris, under the supervision of Dr. Jean Tarneaud, oto-rhino-laryngologist to the hospital and to the Conservatoire National de Musique. Further particulars may be had from Dr. Tarneaud, 27, Avenue de la Grande-Armée, Paris, XVI.

Post-graduate Courses in Berlin

International medical post-graduate courses are to be held in Berlin on the following subjects: internal medicine (March 5th–17th); radiology (March 19th–25th); surgery (April 9th–14th); and genetics (April 23rd–28th). Monthly courses in all the special departments of medical science, including practical work, will also be held. Particulars may be had from the information bureau of the Kaiserin Friedrich-Haus, Robert Koch-Platz 7, Berlin, N.W.7.

Large Gifts to Hospitals

Lord Nuffield (formerly Sir William Morris) has given £45,000 for the erection of a new block of private wards at Guy's Hospital. Altogether he has given £750,000 to hospitals and charities. Towards the fund which University College Hospital is raising on the occasion of its centenary Mr. F. W. Hampshire, chairman of Messrs. F. W. Hampshire & Co., manufacturing chemists of Derby, is giving £5000 per annum for seven years. It is hoped to raise £100,000 for the erection of a pay-bed department.

St. Mary's Hospital Medical School

Dr. C. M. Wilson, dean of the medical school, and Mrs. Wilson were entertained to dinner at Claridge's Restaurant on Jan. 23rd by members of the honorary staff of St. Mary's Hospital and lecturers in the medical school, in celebration of the building of the new school and its opening by the King and Queen on Dec. 12th. Sir William Willcox presided, and on behalf of his colleagues presented Dr. Wilson with a silver cup (a copy of the famous Fire of London cup) and an illuminated address with the names of the subscribers. Those present were: Sir William Willcox, Sir John Broadbent, Sir Ernest Graham-Little, Dr. Sidney Phillips, Mr. Leslie Paton, Dr. Wilfred Harris, Mr. D. C. L. Fitzwilliam, Dr. T. G. Stevens, Dr. G. Harrison Orton, Dr. Reginald Miller, Prof. F. H. Langmead, Prof. C. A. Pannett, Mr. V. Z. Cope, Mr. F. Juler, Prof. J. E. Frazer, Dr. J. Matthews, Dr. A. Fleming, Dr. John Freeman, Mr. Gordon Bryan, Mr. R. M. Handfield-Jones, Dr. T. C. Hunt, Mr. A. W. Bourne, Mr. H. Smale, Dr. G. W. B. James, Dr. J. A. H. Brincker, Dr. W. D. Newcomb, Mr. Williamson-Noble, Dr. Courtney Gage, Mr. Leslie Williams, Dr. G. W. Ellis, Dr. W. Fish, Dr. G. R. Phillips, Dr. A. W. Matthew, Dr. L. Morris, Dr. Justina Wilson, Mr. V. H. Ellis, Mr. A. D. Wright, and, as guest, Mr. B. E. Matthews, for 25 years secretary of the medical school.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, Feb. 6th.—5 P.M., ORTHOPÆDICS AND SURGERY at the Royal College of Surgeons, Lincoln's Inn-fields, W.C.2. (Specimens at 4 P.M.) Special discussion on fibrocystic disease of bone to be opened by Mr. R. C. Elmslie. Other speakers: Dr. John Beattie, Mr. R. Davies-Colley, Mr. H. A. T. Fairbank, Mr. Hermon Taylor, and Mr. H. Jackson Burrows. Members of the Section of Medicine are specially invited to take part in the discussion. 8 P.M., PATHOLOGY. Laboratory Meeting at St. Bartholomew's Hospital, London, E.C. Demonstrations: R. G. Anderson and R. T. Payne: 1. Pathological specimens. L. P. Garrod: 2. Pyogenic effects from pituitary extract. A. H. T. Robb-Smith: 3. Stengel's splenomegaly. 4. Polyarteritis nodosa. 5. Osteogenesis in scar tissue. 6. Cases of reticulo-endothelial hyperplasia. A. W. Spence and E. F. Scowen: 7. The production of simple goitre in rabbits by means of cabbage feeding. R. Kinber: 8. Types of xanthomata. Hermon Taylor: 9. Experimental osteitis fibrosa. E. H. Kettle: 10. Experimental pneumoconiosis: (*a*) The detection of dangerous dusts. (*b*) Infective silicosis.
WEDNESDAY.—5 P.M., HISTORY OF MEDICINE. Prof. D. F. Fraser-Harris: Harvey's Knowledge of Biological Literature. Short demonstration:—Mr. C. A. Peters: Coloured print of Devonshire-place and Wimpole-street from the New Road, St. Marylebone.
FRIDAY.—5.30 P.M., CLINICAL. (Cases at 4.30 P.M.) Cases: Mr. A. Rocyn Jones: 1. Barlow's disease. Mr. C. P. G. Wakeley: 2. Multiple exostosis. Dr. J. H. Sheldon: 3 and 4. Calcinosis universalis. Mr. R. Milnes Walker (introduced by Dr. J. H. Sheldon): 5. Calcification in Raynaud's disease. 6. Multiple tumours of jaws, case for diagnosis. Dr. Terence East: 7. Hæmolytic jaundice (hypersplenism). Mr. Philip Turner: 8. Osteitis fibrosa with spontaneous fracture of the left femur. Dr. H. M. Oddy: 9. Œdema, Milroy type. Mr. H. P. Nelson: 10. Pulmonary tuberculosis treated by apicolysis. 11. Pulmonary tuberculosis treated by thoracoplasty. Dr. F. Parkes Weber and Dr. O. B. Bode: 12. Recklinghausen's neurofibromatosis. Dr. Parkes Weber: 13. Precocious general development of normal type in a girl aged 14. 8.30 P.M., OPHTHALMOLOGY AND DERMATOLOGY. (Cases at 8 P.M.) Discussion on Conditions Common to Ophthalmic and Dermatological Practice, such as Rosacea, Styes, and Eczema, to be opened by Mr. J. H. Doggart and Dr. H. Semon.

HARVEIAN SOCIETY.
THURSDAY, Feb. 8th.—8.30 P.M. (St. Mary's Hospital, Paddington), Clinical Meeting.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY, 11, Chandos-street, W.
THURSDAY, Feb. 8th.—8.30 P.M., Dr. H. M. Palmer: An Atavistic Conception of Psychopathology.

NORTH LONDON MEDICAL AND CHIRURGICAL SOCIETY.
FRIDAY, Feb. 9th.—4.30 P.M. (at St. Mary Islington Hospital): Dr. W. R. M. Turtle: Clinical demonstration.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY, Stepney Green, E.
THURSDAY, Feb. 8th.—3 P.M., Dr. R. Sacks: Clinical Paper.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
MONDAY, Feb. 5th.—5 P.M., Mr. A. A. Davis: The Pre-sacral Nerve.
WEDNESDAY.—5 P.M., Mr. J. M. Yoffey: Lymphoid Tissue.
FRIDAY.—5 P.M., Mr. C. P. G. Wakeley: Surgery of the Pineal Gland (Hunterian Lectures).

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Feb. 5th, to SUNDAY, Feb. 11th.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Course in Dermatology. Afternoons and evenings. Lectures and Demonstrations. (Practical Pathology arranged if desired.) (Open to non-Members.)—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W. Lecture-demonstration on Vomiting and Hæmatemesis, by Dr. A. E. Clark-Kennedy, on Tues. at 2.30 P.M. to 4 P.M.—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W. Course in Neurology. All day. (Specially designed to meet the needs of general practitioners.)—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. Course in Gynæcology. Mornings and/or afternoons.—LONDON CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W. Week-end Course in Physical Medicine. All day, Sat. and Sun.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Lecture-demonstration on Orthopædic Cases, by Mr. K. J. Acton Davis, at 3 P.M. on Sat., Feb. 10th.—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery are available daily by arrangement with the Fellowship of Medicine. Courses of instruction, lectures, clinics, &c., arranged by the Fellowship of Medicine are open only to Members and Associates, unless otherwise stated.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, Balham, S.W.
WEDNESDAY, Feb. 7th.—4 P.M., Mr. V. Z. Cope: Demonstration of Surgical Cases.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY, Feb. 5th.—2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Dr. Martin: Disorders of the Pituitary Body (1).
TUESDAY.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Dr. Critchley: Familial Diseases (3). Spino-cerebellar Degeneration.
WEDNESDAY.—2 P.M., Dr. Martin: Out-patient Clinic. 3.30 P.M., Dr. James Collier: Clinical Demonstration.
THURSDAY.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Dr. Gordon Holmes: Tumours of the Central Nervous System (1).
FRIDAY.—2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Dr. James Collier: Interstitial Neuritis.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.
TUESDAY, Feb. 6th.—3.15 P.M., Mr. A. M. Zamora: Diseases of the Chest from the Point of View of the Throat and Nose Surgeon.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, Feb. 9th.—4 P.M., Mr. W. A. Mill: Difficulty in Swallowing.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.
THURSDAY, Feb. 8th.—4.30 P.M., Dr. A. S. MacNalty: Prevention of Tuberculosis. 9 P.M., Dr. Terence East: Heart Attacks.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, Feb. 5th.—10 A.M., Medical Wards, Skin Clinic. 11 A.M., Surgical Wards. 2 P.M., Medical, Surgical and Eye Clinics, Gynæcological Wards and Clinic. 4.15 P.M., Lecture, Mr. Sinclair: Surgery of Goitre.
TUESDAY.—10 A.M., Medical Wards. 11 A.M., Surgical Wards. 2 P.M., Operations, Medical, Surgical and Throat Clinics.
WEDNESDAY.—10 A.M., Medical and Children's Wards, Children's Clinic. 2 P.M., Gynæcological Operations, Medical, Surgical and Eye Clinic. 3.45 P.M., Venereal Diseases Demonstration.
THURSDAY.—10 A.M., Neurological and Gynæcological Clinics. 11 A.M., Fracture Clinic. 2 P.M., Medical, Surgical, Eye and Genito-urinary Clinics.
FRIDAY.—10 A.M., Skin Clinic. 12 noon, Lecture on Treatment. 2 P.M., Operations, Medical, Surgical and Throat Clinics. 4.15 P.M., Lecture, Mr. Viasto: Pain in the Ear.
SATURDAY.—10 A.M., Medical and Surgical Wards, Children's and Surgical Clinics.
The Lectures at 4.15 P.M. are open to all medical practitioners without fee.

UNIVERSITY COLLEGE, Gower-street, W.C.
WEDNESDAY, Feb. 7th.—5 P.M., Mr. R. J. Ludford, D.Sc.: Physical Properties of Protoplasm (first of six free Lectures on Cytology).

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.
WEDNESDAY, Feb. 7th.—4 P.M., Mr. A. Sorsby: Heredity in Disease.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY, Feb. 6th.—5 P.M., Dr. H. C. G. Semon: Diseases of the Buccal Mucous Membrane.
THURSDAY.—5 P.M., Dr. H. D. Haldin-Davis: Pruritus. Prurigo. Lichenification.

ROYAL INSTITUTION, 21, Albemarle-street, W.
SATURDAY, Feb. 10th.—3 P.M., Prof. G. Elliot Smith: Human Biology.

LEEDS GENERAL INFIRMARY (Post-graduate Clinic).
TUESDAY, Feb. 6th.—4 P.M., Dr. Vining: Infant Feeding and the Digestive Organs of Infancy.

GLASGOW POST-GRADUATE LECTURES.
TUESDAY, Feb. 6th.—3.30 P.M. (in the Faculty Hall, Vincent-street), Mr. W. A. Mackey: Significance of Cholecystitis.
WEDNESDAY.—(In the Royal Samaritan Hospital for Women), Dr. D. McIntyre: Gynæcological Cases.

Appointments

COHEN, H., M.D. Ch.B. Liverp., has been appointed Hon. Physician, Royal Infirmary, Liverpool.
STEPHENS, T. H., M.B., Ch.B. Edin., Medical Officer of Health, Merthyr.
Certifying Surgeons under the Factory and Workshop Acts: BERNARD, A., M.B., Ch.B. Glasg. (Whittlesey, Cambs.); and RILEY, A., M.B., Ch.B. Manch. (Audley, Staffs).

NOTES, COMMENTS, AND ABSTRACTS

REVISION OF THE BRITISH PHARMACEUTICAL CODEX

THE Pharmaceutical Society has had in preparation for several years a new edition of the British Pharmaceutical Codex, which is being revised down to the smallest detail. By dint of close association with the workers on the British Pharmacopœia 1932, it will be possible to include in the revised Codex all the drugs and preparations which were included in the B.P. 1914, but omitted from the B.P. 1932, as well as many new ones which have been found useful during the last decade. While revision is going on summaries of the sections completed by various subcommittees are being issued to provide those interested with information, and Mr. C. E. Corfield, F.I.C., editor of the Codex, asks for suggestions for the improvement of any of the proposed standards. Four such sectional reports are before us, any one of which can be obtained from the Pharmaceutical Press (23, Bloomsbury-square, London, W.C.1) at 1*s.* 6*d.*–2*s.* 6*d.*

A subcommittee on pharmacognosy, of which Mr. T. E. Wallis, F.I.C., is chairman, submits 99 of the 300 monographs on crude drugs of vegetable origin which will be included in the new Codex. Less than 70 of these 300 are included in the B.P. 1932. The suggested standards follow the main plan laid down by the B.P. For each drug mentioned such tests as cold water (benzene or alcoholic) extract, ash, limits of foreign matter, and distinguishing colour tests are given. The identification of cannabis is fully described, while cantharis, ephedra, guarana, and santonica are assayed.

SURGICAL DRESSINGS

The Codex committee did some real constructive work when in 1922–23 it undertook the standardisation of surgical dressings. This was done in collaboration with the Ministry of Health, with the result that the whole series of dressings was set out in the drug tariff on a uniform basis. After ten years some improvements have become desirable, and the report of this subcommittee suggests additions which will be of convenience alike to manufacturer, chemist, and prescriber. Additions to the list are chloramine gauze (4–6 per cent. of chloramine T), iodoform gauze (4–6 per cent.), picric acid gauze (1½ to 2½ per cent. of trinitrophenol), cellulose wadding, oiled paper, gauze and cotton tissue, capsicum tissue, and gauze and cellulose wadding tissue. The large margin of content in the first three is evidently due to the volatility of the chemical impregnation. Euflavine, mercuric chloride, and phenol gauzes will be included without a quantitative standard. Standards for warp and weft per inch, weights of bandages, percentage amount of rubber adhesive compound in certain dressings, water extract, and foreign matter are stated. When the material is impregnated with antiseptic, methods of assay are given. An improved formula is given for capsicum wool, and carbasus immedicata is now called carbasus absorbens. In this report no methods of packing and storing are given, nor any account of sterilisation; these will no doubt be made good before final publication.

ACTION AND USES

The subcommittee, in charge of this section, with Mr. G. R. Boyes, F.I.C., as its chairman, has supplied descriptive portions for about 50 drugs, mostly of animal origin, including toxins, antitoxins, and gland products. A pharmacopœia should not exceed the developments of the manufacturer's laboratory, but within this limitation there is much valuable material for the practitioner. Twenty-three preparations are described, most of which are tested by biological methods. Under antitoxinum scarlatinum there is reference to the methods of Dochez, the Dicks, Schultz-Charlton, Parish-Okell, and Wadsworth-Kirkbride, with an indication of the difficulties in expressing the value in terms of skin-test units. The note on extractum parathyroidei states that the aqueous extract of the active principle can be sterilised by heating. It seems possible, however, that differences in pH and temperature of sterilisation might affect the result. The unit adopted is a biological one. There are excellent short monographs on vitamin concentrates. Under ergosterol and calciferol no reference is made to œstrogenic properties. While full information is given of the units employed, no indication of dosage is given.

PHARMACEUTICAL CHEMISTRY

This subcommittee, with Mr. P. G. W. Self, F.I.C., as its chairman, has concerned itself chiefly with substances for which special tests have been worked out for inclusion in the B.P.C. 1934. The 49 pages include some new colouring matters such as tartrazine and azorubrum, and others like magenta, malachite green, crystal violet, proflavine, and mercurochrome, which have long been in use. The standardisation of mercurochrome was most necessary in view of the great variation in different makes. Azorubrum and tartrazine take the place in the N.H.I. formulary of cochineal and saffron for the colouring of mixtures and lotions. Commercial dried Epsom salts has in the past varied in its water of crystallisation content; it is to be hoped that the one chosen for Morison's paste will make it keep well. Useful paragraphs are those on soluble casein, digitalin—standardised to contain 80 units per gramme (powdered digitalin B.P. = 10 units per gramme), ephedrine and ephedrine sulphate, charcoal, calcium sodium lactate, caffein and sodium salicylate, bromoform, bismuth subgallate, oxyiodogallate, and soluble tartrate. Pathologists will welcome a standardised acetone-free methyl alcohol. There seems some confusion about the two strengths of silver protein, of which the mild form should presumably contain 7·5 to 8·5 per cent. of silver. Adequate tests are given for the identity of thallium acetate, strychnine and its sulphate, strontium bromide, sodium thiosulphate, morrhuate, glycerophosphate and cacodylate, saccharin, many quinine salts, and some 20 essential oils. It is increasingly necessary to have high standards for chemicals to be used by the intravenous route. A liquid paraffin with a viscosity of 60 to 80 seconds will be found more useful for sprays and atomisers than the paraff. liq. B.P. with a viscosity of 260 seconds. Potassium phosphate, and the dihydrogen phosphate now used for buffering solutions, are standardised to contain not less than 98 and 97 per cent. respectively of K_2HPO_4 and KH_2PO_4. Tryparsamide now finds a place in an official book, with complete tests for purity and a biological standard. Orange wine and sherry, omitted from the B.P. 1933, also find a place.

The preparation of a new Codex is a stupendous undertaking and these examples will serve to indicate the amount of expert work which is being put into it by expert subcommittees.

SHORT-WAVE DIATHERMY AND THERAPEUTIC PYREXIA

IN our last issue (p. 214) a correspondent gave some account of electrical apparatus used in the United States and elsewhere for producing artificial pyrexia. Messrs. Watson and Sons (Electro-Medical) Ltd., inform us that they have recently completed experiments on short-wave diathermy apparatus of the same kind, and that one of their machines has been in use at St. Thomas's Hospital, London, since last May.

Usually, in diathermy for medical or surgical purposes, an alternating current with a frequency of about a million cycles per second is passed through the patient's body between electrodes which are applied to the skin. The amount of heat produced

in the tissues in the path of the current depends on their resistance, and in practice it is found that the skin and fat are disproportionately heated, so that it becomes almost impossible to heat deep-lying tissues without overheating the skin. In the short-wave diathermy machine, likewise, there are two metal electrodes; but they are not in contact with the skin. Moreover, the current alternates at 10 to 20 millions per second. The essential difference between the two methods, Messrs. Watson and Sons point out, is as follows:—

With the normal diathermy "a definite potential is applied at two points of the body and is distributed proportionately to the resistance in the path of the electrodes. With the short-wave diathermy a definite potential is *induced* at various points in the path between the electrodes. . . . By suitably positioning the patient the maximum fall of potential may be arranged to coincide with the position of the part which it is desired to heat to the greatest extent, enabling a large current to flow in this region, without in any way overheating the skin. . . . It is possible, therefore, by this method, to arrange for a comparatively even distribution of current in any part of the body or, for that matter, practically the whole of it. It is also hoped that with improvements in technique it will be possible to arrange for intensive local heating in certain areas."

Of the two machines described, the Sunic "Novotherm I" consists of a short-wave radio frequency generator working at wave-lengths between 15 and 30 metres (20 to 10 million cycles per second). This can be used with two large electrode plates in position, or with small plates for local treatment. For the latter, it is suggested, short-wave diathermy has so many advantages over normal diathermy that it will probably go far to supersede it; and the "Novotherm II" is designed to meet the new need. It works at 12 million cycles per second and is so arranged that the patient may be treated in bed, on a couch, or in a chair. The advantages claimed for these two machines include "constant output with different patients and different electrodes, and a definite tuning control."

Further work is being carried out with apparatus for treatment with "ultra-short" waves (2 to 7 metres). Particulars may be had from Messrs. Watson and Sons at Sunic House, Parker-street, London, W.C. 2.

WATER SHORTAGE AND WATER STORAGE

THE water-supply of the country continues to cause anxiety; even in January we find the daily press illustrating and discussing the inconvenience and worse caused by the shortage. The chief water engineer of Manchester has urged his fellow-townsmen to tighten their taps, fill their baths only half full, and economise on their allowance of water for cleaning cars and washing crockery. In the past a drought in summer has generally been made good in the following autumn, but the Scottish department of health tells us that the water in reservoirs is still falling, while in many areas the yield of water from springs has not been appreciably increased by the winter rainfall. "Even if we have a period of long continuous rains," says the *Local Government Chronicle*, "supplies will not reach normal for many years." And it goes on: "The present shortage is evidence of the slowness with which local authorities act. For though the weather last year was entirely unexpected it has been realised for a considerable time that serious steps would have to be taken for conserving and extending the water-supplies of the country. The Local Government Act of 1929 contained provisions directed to this end; and it is surprising both that they were not more drastic and that they have been so little used."

It does not appear that anything has been done, so far, to meet the situation which has arisen and which will continue for some time and may recur. It is by no means unlikely that we have started on a cycle of dry seasons; at any rate we have no right to expect a succession of wet ones. Small local authorities cannot be expected to do much by themselves, they have neither the knowledge nor the money needed for the execution of satisfactory schemes; nor is it desirable that the question, which is a national one, should be considered piecemeal. In his timely lecture at the Royal Society of Arts on Wednesday, Mr. Alan Chorlton, M.P., president of the Institution of Mechanical Engineers, remarked on the curious detachment in the development of a public water-supply. There are, he said, to-day not less than 1100 separate undertakings, still leaving some six millions of persons with no piped supply at all. A study of the map reveals a mosaic of disconnected entities; in industrial districts the mains not infrequently cross in passing out to some village on their borders. Yet the relative smallness of the country and the density of its population renders it peculiarly suitable to some scheme of common working. We are blessed by nature with an ample natural supply of water, and the need to-day in industry is for greater consumption rather than for the restriction which is being urged upon us from all sides. Mr. Chorlton would extend the grid system, so well described by Fortinus when Rome had its daily supply of 100 million gallons, and only matched in our own time by the uniform control under the Metropolitan Water Board. We do not know where in the future the increase in water-supply will be needed; trade declines in one district to expand in another. If only for this reason some interconnexion of undertakings is imperative to meet abnormal conditions, with storage reservoirs to meet conditions of peak demand. With such adjustments it would be not unreasonable to count on a daily ration per head of 50 gallons, even it we could not emulate the 100 gallons not unusual abroad.

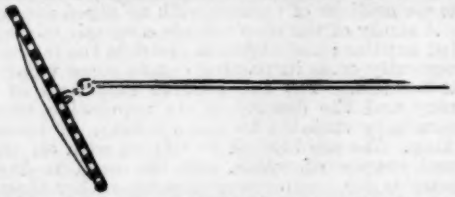
The survey which the Ministry of Health is making should be expedited, some natural grouping of districts prepared, and the arrangements appropriate to each district considered in consultation with local authorities. In some cases tapping of passing large mains, with or without the adoption of Mr. Chorlton's grid scheme, may afford the best solution. In others the water of rivers may be stored and purified, the water being distributed either by gravity or by Mr. Douglas Worger's automatic system. In many villages the mere provision of a stand tap with a constant supply of drinkable water would be a great boon, or a local supply from any purifiable source could be stored and made available by building a water-house as suggested by Mr. J. H. Coste. No such source of water should be neglected, and an early step should be the cessation of pollution of any stream which has a fairly steady flow, and is not yet hopeless. It is no use to talk of the needs of industry and the unavoidable pollution of rivers, if the population is either to die of thirst or be forced to such a low standard of cleanliness that the products of industry become mere luxury.

NURSES' ACCOMMODATION AT A MUNICIPAL HOSPITAL

AT a recent meeting of Bradford city council, Mr. William Leach stated that the accommodation for nurses in St. Luke's, the municipal general hospital, was "inferior to that provided in jails and common lodging houses," that they had to sleep in curtained cubicles, with no doors or windows, and that the ventilation was foul. Dr. J. J. Buchan, medical officer of health, did not dispute these statements, agreeing that the health committee would certainly never pass similar plans for a common lodging house. He added that of the 226 nurses, 56 are provided with bedrooms at the home, while the remainder occupy curtained cubicles. The beds are occupied night and day and there is no privacy for the tenants. Many of these girls had stuck to their job simply because of the excellence of the training given at St. Luke's. Asked if any of the nurses had complained about the accommodation, Dr. Buchan replied: "226." Plans are now being prepared for a new nurses' home, estimated to cost between £26,000 and £30,000.

ADJUSTABLE SPECTACLES

In the course of an address given last month to the Edinburgh Royal Medical Society, Dr. Lachlan Grant spoke of the small but significant eyestrain which may arise from the wearing of glasses when their axis is notably different from that of vision. In reading in bed, for example, a person wearing spectacles may find that the print grows indistinct as he reaches the bottom of the page, because he is looking obliquely through the lower half of his glasses. This



may be partly overcome by the use of toric lenses. Dr. Grant avoids it by prescribing spectacle frames in which the angle of the lens can be altered through a joint at the junction of the folding arm and the lens ring (see Figure). They can easily be adjusted to give the correct focus whenever the least blurring of type is noticed, and in work such as typing, in which the eyes are constantly looking downwards, they sometime prove useful. Similarly there are games such as billiards in which they give additional efficiency. In Dr. Grant's opinion, however, it is inadvisable to have them fitted as a routine, for these "any angle" frames require more careful handling than the ordinary kind. Another point which cannot be disregarded is that the wearer may become so engrossed in his work or his novel that he neglects to make the necessary adjustments, and is actually worse off than with ordinary spectacles.

CHILDREN'S ALLOWANCES

In Committee of the House of Commons on the Unemployment Bill on Monday last Capt. Crookshank (C.), Gainsborough, moved an amendment to raise the rate of weekly benefit in respect of each dependent child to not less than 3s. This was, he said, admitted by most of those in touch with the condition of the people as the greatest need of the moment. He was supported in his appeal by 13 members of all parties. Mr. Curry (Lib. Nat.), Bishop Auckland, said that the amendment did no more than express what was the general feeling throughout the country. Lord Eustace Percy (C.), Hastings, remarked that the strength of the support for the amendment and the depth of feeling in the House on the subject were obvious. Sir Henry Betterton, Minister of Labour, said he did not dispute it was the general opinion of the country that the children's allowance should be increased, but the amendment would cost nearly £2,000,000 and the Unemployment Insurance Statutory Committee which was to be set up would be able to deal with the matter. The amendment was lost by 200 votes to 104—a Government majority of only 96.

Vacancies

For further information refer to the advertisement columns

Aylesbury, Royal Buckinghamshire Hospital.—Res. M.O. At rate of £200.
Birmingham, Queen's Hospital.—H.S. to Ear, Nose, and Throat Dept. At rate of £70.
Birmingham, Selly Oak Hospital.—Cas. O. At rate of £200.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.P. At rate of £120.
Bootle General Hospital.—H.P., Two H.S.'s., and Cas. O. Each at rate of £150.
Bradford City Sanatorium, Grassington.—H.P. £175.
Brighton, Royal Sussex County Hospital.—Asst. Pathologist. £500.
Bristol General Hospital.—H.S. to Spec. Depts. At rate of £80.
Croydon County Borough.—Two Asst. M.O.'s and Asst. School M.O.'s. Each £500.
Dorset County Council.—Chief Clin. Tuber. O. £750.
Durham County Council.—District Tuber. M.O. £500.
Great Barrow, East Lancashire Tuberculosis Colony.—H.P. At rate of £100.
Hastings, Royal East Sussex Hospital.—Asst. Pathologist. £300.
Kendal, Westmorland County Hospital.—H.S. At rate of £200.
King's College Hospital, Denmark Hill, S.E.—Hon. Radiologist.
Liverpool Royal Children's Hospital.—Res. M.O. and Res. Surg. O. for Heswall Branch. Each at rate of £120. Also Two Res. H.P.'s and Two Res. H.S.'s for City Branch. Each at rate of £100.
Liverpool, Royal Southern Hospital.—Res. Cas. O. Also Res. Orthopædic H.S. At rate of £100 and £60 respectively.
Liverpool University.—Bacteriologist. £1500.
London Hospital, E.—Medical First Asst. and Reg. £300.
London Lock Hospital, 91, Dean-street, W.—Res. M.O. to Male Depts. At rate of £175.
Manchester, Ancoats Hospital.—Two H.S.'s. Each at rate of £100.
Manchester Babies' Hospital, Burnage-lane, Levenshulme.—Sen. Res. M.O. At rate of £125.
Manchester, St. Mary's Hospitals.—Asst. M.O. for Children's Out-patient Dept. At rate of £150.
Manchester and Salford Hospital for Skin Diseases.—H.S. At rate of £100.
Manchester, Victoria Memorial Jewish Hospital, Cheetham.—Res. Surg. O. £200.
Maudsley Hospital, Denmark Hill, S.E.—M.O. £300.
Middlesbrough, North Riding Infirmary.—Sen. H.S. £200.
Newcastle-on-Tyne, Wooley Sanatorium.—Asst. M.O. £350.
Nottingham General Hospital.—Res. Cas. O. Also H.S. At rate of £200 and £150 respectively.
Preston and County of Lancaster Royal Infirmary.—Cas. O. £150.
Public Dispensary, 122, Drury-lane, W.C.—Res. M.O. £150.
Queen's Hospital for Children, Hackney-road, E.—H.S. and Cas. O. Each at rate of £100.
Royal Masonic Hospital, Ravenscourt Park, W.—H.P., Surgeons, &c.
Royal Northern Hospital, Holloway, N.—H.P. Also Obstet. H.S. Each at rate of £70.
Salvation Army, Mother's Hospital, Lower Clapton-road, E.—Jun. Res. M.O. At rate of £80.
Sheffield Royal Infirmary.—Asst. Aural and Ophth. H.S. and H.P. to Dermatologist. Each at rate of £80.
Shoreham-by-Sea, Southlands Hospital.—Asst. M.O. £350.
Southampton Children's Hospital and Dispensary for Women. Hon. Surgeon.
Southampton, Royal South Hants Hospital.—Hon. Surgeon. Also Hon. Surgeon to Ear, Nose, and Throat Dept.
South Eastern Hospital for Children, Sydenham, S.E.—Jun. Res. M.O. At rate of £120.
St. Thomas's Hospital—Obstetrician and Gynæcologist.
Tancred's Studentships. Each £100.
Taunton, Somerset and Bath Mental Hospital, Cotford.—Res. Sen. Asst. M.O. £550.
Warwick County Mental Hospital, Hatton.—Second Asst. M.O. £400.
West End Hospital for Nervous Diseases, Gloucester Gate, Regent's Park, N.W.—Hon. Anæsthetist. Also Hon. Dental Surgeon. Also Sen. H.P. At rate of £150.
Westminster Hospital, Broad-sanctuary, S.W.—Research Asst. to Cancer Research Dept. £350.
Wolverhampton Education Committee.—Asst. School M.O. £700.
The Chief Inspector of Factories, Home Office, S.W., announces a vacancy for a Certifying Factory Surgeon at Ongar, Essex.

Births, Marriages, and Deaths

BIRTHS

BARTLETT.—On Jan. 18th, at Saffron Walden, the wife of Dr. Justinian Bartlett, of a son.
FRENCH.—On Jan. 24th, at Marlborough-gardens, Greenford, to Peggy, wife of Dr. Alistair French, R.A.F.—a son.
GRANT.—On Jan. 23rd, at Folkestone, the wife of Andrew Grant, O.B.E., M.B., D.O.M.S., of a daughter.
HOLTBY.—On Jan. 22nd, at "Strathmore," Bude, N. Cornwall, the wife of Harold Holtby, M.B., B.S., of a daughter.

MARRIAGES

ASKEY—BILLING.—On Jan. 27th, at St. Peter's, Clapham, Stephen Grange Askey, M.A., M.D., B.Chir. Camb., to Jeannette, eldest daughter of Mrs. Billing and the late Stuart Morrison Billing.
EVANS—KEEP.—On Jan. 18th, at St. Augustine's Church, Edgbaston, Lewis Philip Jameson Evans, F.R.C.S., to Edith Sylvia, younger daughter of Mr. and Mrs. C. E. Keep, of Edgbaston.
HAINES—WILLIAMS.—On Jan. 25th, in London, John Finch Haines, M.D., to Nancy Williams.
KENNEDY—KEYES.—On Jan. 20th, at Holy Trinity Church Dartford, Kent, Robert Stewart Kennedy, M.B., Ch.B. Glasg., D.P.M. (R.C.P. and S. Lond.), to Marjorie, daughter of Mr. and Mrs. S. K. Keyes, The Dene, Dartford.

DEATHS

BELL.—On. Jan. 25th, at "Chandos," Hart Hill, Luton, Beds, Robert Daniels Bell, M.C., M.A., M.B., Ch.B., aged 58 years.
BROWN.—On Jan. 8th, at Park-lane, Aldeburgh, Suffolk, Arthur Campbell Brown, M.B., aged 53 years.
MEEK.—On Jan. 28th, at Barrow-road, Streatham, John William Meek, M.D. Lond., B.Sc. Vict., aged 79 years.
POWELL.—On Jan. 27th, suddenly, at Duke-street, W., Dr. Llewelyn Powell, anæsthetist.
QUINTON.—On Jan. 26th, at Twyford, Hants, Richard Frith Quinton, M.D., late Governor, H.M. Prison Service, in his 86th year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.